United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with United States Department of the Interior, Bureau of Land Management; University of Idaho, College of Agriculture; and Idaho Soil Conservation Commission

Soil Survey of Jerome County and Part of Twin Falls County, Idaho

How to Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

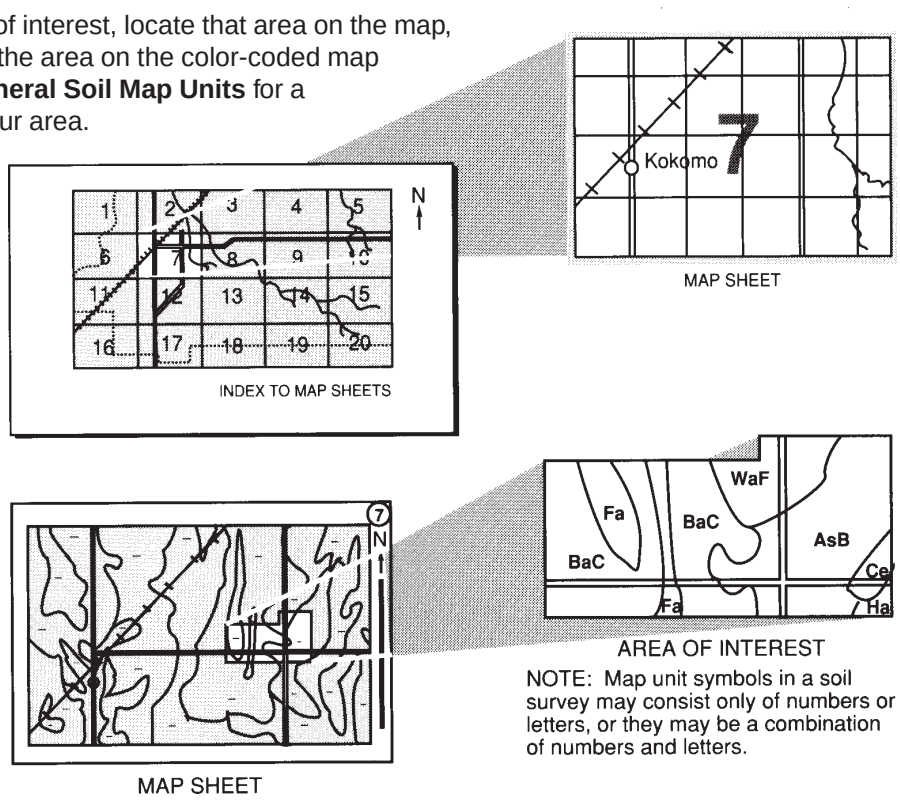
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map units symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1991. Soil names and descriptions were approved in 1991. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1991. This survey was made cooperatively by the Natural Resources Conservation Service and the United States Department of the Interior, Bureau of Land Management; the University of Idaho, College of Agriculture; and the Idaho Soil Conservation Commission. The survey is part of the technical assistance furnished to the Balanced Rock, Twin Falls, and North Side Soil Conservation Districts and the Snake River Soil and Water Conservation District.

Since the publication of this survey, more information on soil properties may have been collected, new interpretations developed, or existing interpretive criteria modified. The most current soil information and interpretations for this survey are in the Field Office Technical Guide (FOTG) at the local Natural Resources Conservation Service field office. The soil maps in this publication may exist in digital form in a full quadrangle format. The digitizing of the maps is in accordance with the Soil Survey Geographic (SSURGO) database standards. During the digitizing process, changes or corrections to the maps may have occurred. These changes or corrections improve the matching of this survey to adjacent surveys and correct previous errors or omissions of map unit symbols or lines. If digital SSURGO certified maps exist for this survey, they are considered the official maps for the survey area and are part of the FOTG at the local Natural Resources Conservation Service field office.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Irrigated soils in the survey area. The Snake River Canyon separates Jerome County in foreground and Twin Falls County in background.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 1998

Foreword

This soil survey contains information that can be used in land-planning programs in Jerome County and part of Twin Falls County, Idaho. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance, Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of
Jerome County and Part of Twin Falls County, Idaho

By Dal Ames, Natural Resources Conservation Service

Fieldwork by Dal Ames, Daryl Lund, Donnie Holbrook, and Kimberly Blake, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service
in cooperation with
United States Department of the Interior, Bureau of Land Management; University of Idaho, College of Agriculture; and Idaho Soil Conservation Commission

Older surveys of Jerome Area, Idaho, and Twin Falls Area, Idaho, were published in 1927 (*13*) and 1921 (*12*), respectively. These earlier surveys cover a part of the present survey. The present survey, however, updates the earlier surveys and provides additional information and larger maps that show the soils in greater detail.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent surveys, including Minidoka Area, Idaho; Cassia County, Idaho, Western Part; Elko County, Northeast Part, Nevada; and Elmore County, Idaho.

Jerome County and Part of Twin Falls County is in south-central Idaho (fig. 1). It includes private, State, and Federal land. The portion of the Sawtooth National Forest in Twin Falls County was excluded from the survey area. Federal land in the area is administrated by the Bureau of Land Management. The survey area comprises about 2,396 square miles, of which 387,300 acres is in Jerome County and 1,161,600 acres is in Twin Falls County. In 1991 the population of the county seats was about 7,000 in Jerome and 27,000 in Twin Falls.

The northern two-thirds of the survey area is generally flat, but it is marked by shield volcanoes and volcanic vents. It is drained by the Snake River, which flows from east to west through a canyon that is as much as 500 feet deep and about 30 miles long. It was created partially by the Bonneville Flood. The overflow of ancient Lake Bonneville also scoured an area about 6 miles wide and 30 miles long in Jerome County. The overflow emptied back into the canyon at the Blue Lakes Alcove. Fifteen miles further downstream the flood created Mellon Valley, which is north and west of Buhl, Idaho. This is an area characterized by basaltic “melons”

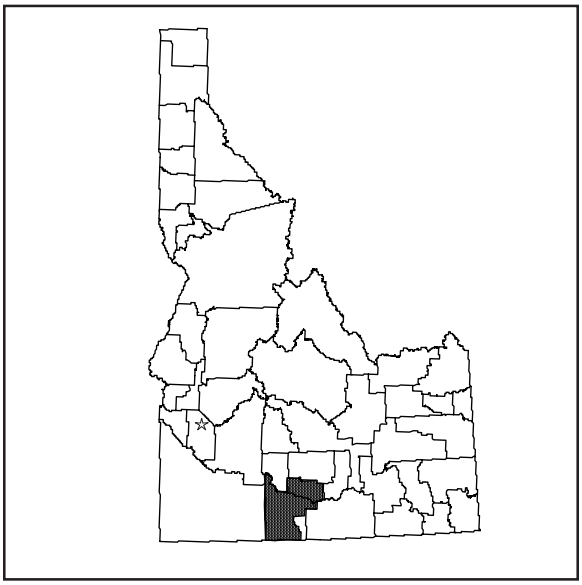

Figure 1.—Location of Jerome County and Part of Twin Falls County in Idaho.

that are one foot to more than 20 feet in diameter *(8)*. The southern one-third of the survey area is an upland composed of terraces, basins, ridges, and summits incised south to north by canyon drainageways. Salmon Falls Creek drains this area through a canyon as much as 400 feet deep. The creek empties into the Snake River in the northwestern part of the survey area.

The lowest point in the survey area, about 2,700 feet in elevation, is along the Snake River, in the northwestern corner of the area. The towns of Jerome and Twin Falls, which are in the north-central part of the survey area, are about 3,700 feet in elevation. Hollister, which is centrally located in the area, is about 4,500 feet in elevation. The highest point, about 7,700 feet in elevation, is in the extreme southwestern corner of Twin Falls County.

General Nature of the Survey Area

This section gives general information concerning Jerome County and part of Twin Falls County. It discusses history and development, water supply, agriculture, and climate.

History and Development

The first known inhabitants in the survey area were Shoshone and Northern Paiute Indians, who seasonally migrated between the Snake River and the southern uplands. In 1811 the Pacific Fur Company explored the area. Beaver trappers frequented the local streams in the 1820's and 1830's. The Oregon Trail, which generally followed the Snake River, was established in 1843. Emigrants passed through the area until 1863, when the Halliday Stage Line built Home Station on Rock Creek. Two years later Rock Creek Station, the area's first store, was erected next to Home Station. About 1865 gold was discovered along the Snake River. The placer mining camps of Dry Town, Mudbarville, Springtown, and Waterbug boomed, but they were busted by 1875.

Cattle ranching, an important industry in the late 1870's, remained the main industry in the survey area until the availability of irrigation water for farming. In 1903 Milner Dam on the Snake River was completed. Farmers then settled the central part of the area, which resulted in the establishment of Jerome and Twin Falls Counties. The city of Twin Falls was platted in 1904, and Twin Falls County was formed from the western part of Cassia County in 1907. In 1919 Jerome County was created from parts of Minidoka, Lincoln, and Gooding Counties. The city of Jerome was founded the same year. The towns of Buhl, Jerome, and Twin Falls became the main shopping and industrial centers. Other smaller towns served as secondary shopping centers for their immediate areas.

Water Supply

Seasonal runoff and the Snake Plain aquifer supply the water used for irrigation in the area. Irrigation water is available from reservoirs and small stream storage areas and is pumped from creeks, rivers, and wells. Milner Dam on the Snake River, Salmon Falls Dam on Salmon Falls Creek, and Cedar Creek Dam on Cedar Creek, which were constructed shortly after the turn of the century, are the main reservoirs. Stored water from these dams irrigates about 85 percent of the cropland in the survey area. The remaining cropland is irrigated by water pumped from the Snake River, Salmon Falls Creek, and the Snake River aquifer. Stockwater for the rangeland in the area is obtained from streams, springs, and wells.

Wells, which are supplied by the Snake River aquifer, provide the water for domestic, municipal, and industrial use. Average well depth is about 200 to 320 feet, but depth ranges from artesian to more than 600 feet *(5)*. Wells north of the Snake River generally are deeper than those on the southern side of the survey area. Hot water wells are used for heat and recreation.

Agriculture

Cattle ranches were the dominant agricultural industry in the survey area before the development of irrigated farmland. Livestock still provide almost one-half of the agricultural income, and about 65 percent of the land in the area is used for livestock. Irrigation projects reduced the acreage of rangeland by about 30 percent, but many farms still have small cow-calf or beef operations. Dairies, which furnish products statewide, and stock operations are increasing. Sheep and hogs are raised on a few farms *(6)*.

Sparse rainfall makes irrigation essential for successful farming. The Reclamation Act of 1902 provided funds for construction of reservoirs, canals, and irrigation control structures that began operating in 1904. The main crops grown in the area are spring wheat, alfalfa hay, barley, winter wheat, dry beans, potatoes, sugar beets, and corn silage. The total acreage used for each crop varies as crop prices fluctuate. Irrigation water is applied mainly by surface methods, but some sprinkler systems are used. Use of commercial fertilizers and improved varieties of crops has increased overall average yields.

Three soil conservation districts and one soil and water conservation district serve the area. The North Side Soil Conservation District was founded in 1946, the Twin Falls Soil Conservation District in 1951, the Balanced Rock Soil Conservation District in 1961, and the Snake River Soil and Water Conservation District in 1966. These districts work to control water and wind erosion by encouraging minimum tillage and efficient use of irrigation water while promoting agricultural research to improve crop yields and rangeland conditions. These districts have started numerous clean water projects that have reduced soil erosion on cropland and sedimentation of perennial streams.

Climate

Prepared by the Natural Resources Conservation Service, Water and Climate Center, Portland, Oregon.

The climate tables were created from data recorded at Hollister, Jerome, and Twin Falls, Idaho, during the period 1961 to 1990. Thunderstorm days, relative humidity, percent sunshine, and wind information were estimated from data recorded at the first order station at Boise, Idaho.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Hollister, Jerome, and Twin Falls. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average daily temperature is 29.9 degrees F at Hollister, 29.3 degrees at Jerome, and 29.1 degrees at Twin Falls and the average daily minimum temperature is 20.5, 20.1, and 20.5 degrees, respectively. The lowest temperature on record at Hollister was -27 degrees recorded on December 22, 1990; at Jerome, -24 degrees recorded on December 22, 1990; and at Twin Falls, -21 degrees recorded on December 23, 1990. In summer, the average daily temperature is 67.2 degrees at Hollister, 69.9 degrees at Jerome, and 66.2 degrees at Twin Falls and the average daily maximum temperature is 82.9 degrees at Hollister, 87.1 degrees at Jerome, and 81.5 degrees at Twin Falls. The highest temperature on record at Hollister was 101 degrees on August 7, 1983; at Jerome, 106 degrees on August 9, 1990; and at Twin Falls, 101 degrees on July 11, 1973.

Growing degree days, shown in table 1, are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 10.14 inches at Hollister, 10.23 inches at Jerome, and 10.60 inches at Twin Falls. Of this, about 3 inches, or 30 percent, usually falls in June through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall recorded was 1.91 inches on May 8, 1995, at Hollister; 1.63 inches on April 21, 1981, at Jerome; and 1.55 inches on May 8, 1995, at Twin Falls. Thunderstorms occur on about 15 days each year, and most occur during the period May through August.

The average seasonal snowfall is 23 inches at Hollister, 19.1 inches at Jerome, and 28.7 inches at Twin Falls. The greatest snow depth at any one time on record at Hollister was 12 inches on December 29, 1992; at Jerome, 13.7 inches on January 19, 1964; and at Twin Falls, 14 inches on November 30, 1985.

The average relative humidity in midafternoon is about 40 percent. Humidity is higher at night, and the average at dawn is about 65 percent. The sun shines 83 percent of the time in summer and 45 percent of the time in winter. The prevailing wind is from the west. Average windspeed is highest, 10 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the

survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

This survey area was mapped at two levels of detail. At the more detailed level, map units are narrowly defined. Map unit boundaries were plotted and verified at closely spaced intervals. At the less detailed level, map units are broadly defined. Boundaries were plotted and verified at wider intervals. The detail of mapping was selected to meet the anticipated long-term use of the survey, and the map units were designed to meet the needs for that use.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Some soil boundaries and soil names on the general soil map for this survey area do not match those on the general soil maps for the adjacent survey areas, including Minidoka Area, Idaho; Cassia County, Idaho, Western Part; Elko County, Northeast Part, Nevada; and Elmore County Area, Idaho. Differences are the result of changes in series concepts, variations in slope groupings, and the application of the latest soil classification system. The differences are explained in detail in the final field review report (available in the State office of the Natural Resources Conservation Service in Boise, Idaho).

Soil Descriptions

Dominantly nearly level to moderately sloping, mesic soils that are shallow to very deep over a duripan, moderately deep over bedrock, and very deep and formed in alluvium; on terraces

Number of map units: 5
Percentage of survey area: 44 percent

1. Purdam-Rakane-Blacknest

Well drained soils that are moderately deep over a duripan and very deep and have slopes of dominantly 1 to 15 percent

Percentage of survey area: 6 percent
Elevation: 3,000 to 4,000 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Bahem, Chuska, Dolman, Kudlac, Owsel, Roseworth, Scoon, Sluka, Tulch, and Yahoo soils
Percentage of unit: Minor components—25 percent
Present uses: Irrigated cropland and rangeland

2. Portneuf

Well drained soils that are very deep and have slopes of dominantly 0 to 8 percent

Percentage of survey area: 15 percent
Elevation: 3,000 to 4,000 feet

Frost-free period: 120 to 140 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Bahem, Dolman, Minidoka, Minveno, Rad, Shano, Sluka, Trevino, and Tulch soils
Percentage of unit: Minor components—30 percent
Present use: Irrigated cropland (fig. 2)

Figure 2.—Sugar beets in an area of general soil map unit 2 in foreground.

3. Sluka-Minveno

Well drained soils that are moderately deep and shallow over a duripan and have slopes of dominantly 0 to 8 percent

Percentage of survey area: 10 percent
Elevation: 3,000 to 4,500 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Chiara, Minidoka, Portneuf, Rad, and Trevino soils
Percentage of unit: Minor components—30 percent
Present use: Irrigated cropland

4. Power-McCain-Paulville

Well drained soils that are very deep and moderately deep over basalt and have slopes of dominantly 1 to 8 percent

Percentage of survey area: 10 percent
Elevation: 3,500 to 4,500 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 9 to 11 inches
Position on landscape: Terraces
Minor components: Barrymore, Hoosegow, Idow, and Owinza soils, Rock outcrop, Sidlake and Starbuck soils
Percentage of unit: Minor components—30 percent
Present uses: Rangeland and irrigated cropland

5. Kecko-Taunton-Harsan

Well drained soils that are very deep to moderately deep over a duripan and have slopes of dominantly 1 to 8 percent

Percentage of survey area: 3 percent
Elevation: 2,900 to 4,400 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Emberton, Jestrick, Quincy, and Sidlake soils
Percentage of unit: Minor components—30 percent
Present uses: Irrigated cropland and rangeland

Rock outcrop, and dominantly nearly level to moderately sloping, mesic soils that are shallow, moderately deep, and very deep over a duripan and shallow to very deep over bedrock and formed in alluvium; on terraces, dip slopes, and ridges

Number of map units: 7
Percentage of survey area: 34 percent

6. Rock outcrop-Banbury-Paulville

Rock outcrop, and well drained soils that are shallow and very deep over bedrock and have slopes of dominantly 2 to 6 percent

Percentage of survey area: 5 percent
Elevation: 3,500 to 4,500 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 9 to 10 inches
Position on landscape: Banbury and Paulville soils—terraces
Minor components: Emberton, Kecko, Shano, Suepert, and Taunton soils
Percentage of unit: Minor components—15 percent
Present use: Rangeland

7. Chuska-Colthorp

Well drained soils that are shallow over a duripan and have slopes of dominantly 2 to 12 percent

Percentage of survey area: 11 percent
Elevation: 4,200 to 5,500 feet
Frost-free period: 100 to 120 days
Average annual precipitation: 9 to 12 inches
Position on landscape: Chuska soil—dip slopes, ridges, and terraces; Colthorp soil—terraces
Minor components: Ackett, Lankbush, Owsel, Purdam, Roseworth, Rogerson, Schnipper, Shabliss, Sluka, Udaho, and Weash soils
Percentage of unit: Minor components—30 percent
Present uses: Rangeland and irrigated cropland

8. Roseworth

Well drained soils that are shallow over a duripan and have slopes of dominantly 1 to 8 percent

Percentage of survey area: 6 percent
Elevation: 4,000 to 4,600 feet
Frost-free period: 100 to 120 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Blacknest, Bluegulch, Chuska, Elijah, Lud, Owsel, Purdam, Rakane, and Yahoo soils
Percentage of unit: Minor components—30 percent
Present uses: Rangeland and irrigated cropland

9. Lud-Elijah-Pigtail

Well drained soils that are shallow and moderately deep over a duripan and have slopes of dominantly 2 to 10 percent

Percentage of survey area: 3 percent
Elevation: 4,500 to 5,300 feet
Frost-free period: 100 to 120 days
Average annual precipitation: 9 to 11 inches
Position on landscape: Terraces
Minor components: Ackett, Owsel, and Tanner soils
Percentage of unit: Minor components-—10 percent
Present use: Rangeland

10. Chiara

Well drained soils that are shallow over a duripan and have slopes of dominantly 1 to 8 percent

Percentage of survey area: 4 percent
Elevation: 4,000 to 4,500 feet
Frost-free period: 120 to 140 days
Average annual precipitation: 8 to 10 inches
Position on landscape: Terraces
Minor components: Bahem, Colthorp, Owsel, Purdam, Shabliss, and Sluka soils
Percentage of unit: Minor components—20 percent
Present uses: Rangeland and irrigated cropland

11. Windypoint-Arbidge

Well drained soils that are moderately deep over a duripan or very deep over bedrock and have slopes of dominantly 1 to 4 percent

Percentage of survey area: 3 percent
Elevation: 4,000 to 5,500 feet
Frost-free period: 100 to 130 days
Average annual precipitation: 8 to 12 inches
Position on landscape: Terraces
Minor components: Antelope Springs, Blacknest, Chuska, Owsel, Paulville, Purdam, Roza, and Scoon soils
Percentage of unit: Minor components—20 percent

Present uses: Irrigated cropland and rangeland

12. Ackett

Well drained soils that are shallow over a duripan and have slopes of dominantly 2 to 10 percent

Percentage of survey area: 2 percent
Elevation: 4,900 to 5,600 feet
Frost-free period: 90 to 120 days
Average annual precipitation: 10 to 12 inches
Position on landscape: Stream terraces
Minor components: Aeric Fluvaquents; Chuska, Gosinta, Lankbush, Nawt, and Oshone soils; Rock outcrop; Stricker and Udaho soils; Xerorthents
Percentage of unit: Minor components—25 percent
Present use: Rangeland

Rock outcrop, and dominantly steep to very steep, mesic soils that are shallow to very deep over bedrock and formed in colluvium; on breaks

Number of map units: 1
Percentage of survey area: 4 percent

13. Rock outcrop-Xerorthents

Rock outcrop, and well drained soils that are shallow to very deep over bedrock and have slopes of dominantly 40 to 75 percent

Percentage of survey area: 4 percent (fig. 3)
Elevation: 2,800 to 5,500 feet
Frost-free period: 100 to 140 days
Average annual precipitation: 8 to 12 inches
Position on landscape: Breaks
Minor components: Ackett and Antelope Springs soils; areas of Badlands; Banbury, Chuska, Fathom, Kudlac, Roseworth, Trevino, and Udaho soils
Percentage of unit: Minor components—35 percent
Present use: Rangeland

Dominantly gently sloping to steep, frigid and cryic soils that are shallow to very deep over bedrock and shallow and moderately deep over a duripan and formed in alluvium, colluvium, and residuum; on breaks, dip slopes, hill slopes, ridges, summits, and terraces

Number of map units: 6
Percentage of survey area: 18 percent

14. Tanner-Budlewis-Arness

Well drained soils that are shallow and moderately deep over a duripan and have slopes of dominantly 2 to 6 percent

Percentage of survey area: 2 percent
Elevation: 5,100 to 6,000 feet
Frost-free period: 90 to 100 days
Average annual precipitation: 11 to 15 inches
Position on landscape: Terraces
Minor components: Aninto, Chayson, Chuska, Eep, Howcree, Hutton, Iwica, and Pigtail soils; Rock outcrop; Xerorthents; and Udaho soils
Percentage of unit: Minor components—30 percent
Present use: Rangeland

Figure 3.—Rock outcrop on upper slopes and Xerorthents on lower slopes in an area of general soil map unit 13. Salmon Falls Creek flows through the area.

15. Oshone-Aninto-Tock

Well drained soils that are moderately deep over a duripan and very deep over bedrock and have slopes of dominantly 1 to 12 percent

Percentage of survey area: 5 percent
Elevation: 5,200 to 6,100 feet

Frost-free period: 90 to 100 days
Average annual precipitation: 12 to 16 inches
Position on landscape: Terraces
Minor components: Bancy, Doodlelink, Eep, Elhina, Forvic, Isknat, Nawt, Ruclick, Stricker, Tanner, Tucker, Wagonjacket, and Zola soils
Percentage of unit: Minor components—40 percent
Present use: Rangeland

16. Brose-Amboat-Ragpie

Well drained soils that are shallow and very deep over bedrock and have slopes of dominantly 2 to 20 percent

Percentage of survey area: 3 percent
Elevation: 5,000 to 6,600 feet
Frost-free period: 70 to 110 days
Average annual precipitation: 12 to 16 inches
Position on landscape: Brose and Amboat soils—summits; Ragpie soils—ridges and dip slopes
Minor components: Congle, Doodlelink, Flatron, and Ruclick soils
Percentage of unit: Minor components—25 percent
Present use: Rangeland

17. Keman-Dehana-Rutherford

Well drained soils that are very deep and moderately deep over bedrock and have slopes of dominantly 2 to 25 percent

Percentage of survey area: 3 percent (fig. 4)
Elevation: 5,800 to 7,700 feet
Frost-free period: 20 to 60 days
Average annual precipitation: 15 to 25 inches
Position on landscape: Keman soils—summits; Dehana soils—hill slopes and breaks; Rutherford soils—ridges and dip slopes
Minor components: Eep, Hogmalat, and Kavon soils
Percentage of unit: Minor components—25 percent
Present use: Rangeland

18. Doodlelink-Stricker-Nawt

Well drained soils that are very deep and deep over bedrock and have slopes of dominantly 15 to 60 percent

Percentage of survey area: 3 percent
Elevation: 4,300 to 6,400 feet
Frost-free period: 80 to 110 days
Average annual precipitation: 12 to 18 inches
Position on landscape: Breaks
Minor components: Congle, Gosinta, Mackey, Ruclick, and Udaho soils
Percentage of unit: Minor components—40 percent
Present use: Rangeland

19. Eep-Mug-Player

Well drained soils that are very deep and moderately deep over bedrock and have slopes of dominantly 2 to 65 percent

Percentage of survey area: 2 percent
Elevation: 5,400 to 6,500 feet
Frost-free period: 60 to 100 days
Average annual precipitation: 12 to 20 inches
Position on landscape: Eep soils—hill slopes and breaks; Mug soils—terraces; Player soils—breaks
Minor components: Dehana, Keman, Hogmalat, and Rutherford soils
Percentage of unit: Minor components—15 percent
Present use: Rangeland

Figure 4.—Area of general soil map unit 17. Keman soils in foreground, Dehana soils on wooded hillsides, and Rutherford soils on ridgetops.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or

management. For example, Taunton sandy loam, 1 to 4 percent slopes, is a phase of the Taunton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Brose-Amboat complex, 2 to 20 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Stricker-Nawt-Rock outcrop association, 15 to 30 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop-Xerorthents complex, very steep, is an example.

Some of the boundaries on the detailed soil maps of the Jerome County and Part of Twin Falls County, Idaho, soil survey do not match those on the soil maps of adjacent soil surveys of Minidoka Area, Idaho; Cassia County, Idaho, Western Part; Elko County, Northeast Part, Nevada; and Elmore County Area, Idaho. Some of the soil names and descriptions do not fully agree. Differences are the result of modifications or refinements in soil series concepts, variations in the intensity of mapping, or the extent of the soils in the survey area. The differences are explained in detail in the final field review report (on file in the Natural Resources Conservation Service State office in Boise, Idaho).

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see “Table of Contents”) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

In the map unit descriptions that follow, a semitabular format is used. In this format a boldface heading (for example, *Composition*) is used to identify the kind of information grouped directly below it. Introducing each item of information under the heading is an italicized term or phrase (for example, *Position on landscape:*) that identifies or describes the information. Many of the boldface headings and introductory terms or phrases are self-explanatory; however, some of them need further explanation. These explanations are provided in the following paragraphs, generally in the order in which they are used in the map unit descriptions.

Composition is given for the components identified in the name of the map unit as well as for the contrasting inclusions.

Inclusions are areas of components (soils or miscellaneous areas) that differ from the components for which the unit is named. Inclusions can be either similar or contrasting. *Similar inclusions* are components that differ from the components for which the unit is named but that for purposes of use and management can be considered to be the same as the named components. Note that in the “Composition” paragraph a single percentage is provided for a named soil and the similar inclusions because their use and management are similar.

Contrasting inclusions are components that differ sufficiently from the components for which the unit is named that they would have different use and management if they were extensive enough to be managed separately. For most uses, contrasting inclusions have limited effect on use and management. Inclusions generally are in small areas, and they could not be mapped separately because of the scale used. Some small areas of strongly contrasting inclusions are identified by a special symbol on the detailed soil maps. A few inclusions may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the inclusions on the landscape.

Position on landscape refers to the dominant position or positions on which the component is located. In naming landscape positions, an effort has been made to give the specific position of the component rather than a general position that could encompass other components. In

some instances, however, the component is distributed over a larger landscape to such a degree that it is more nearly accurate to name the larger landscape positions rather than the local ones.

Typical profile is a vertical, two-dimensional section of the soil extending from the surface to a restrictive layer or to a depth of 60 inches or more.

Depth class is an adjective term (for example, moderately deep) for the depth of the soil.

Permeability is the quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil.

Available water capacity is the capacity of the soil to hold water available for use by most plants. It commonly is expressed as inches of water per inch of soil (see "Glossary").

Hazard of water erosion refers to the hazard if protective plant cover is removed. The hazard of erosion is constant and cannot be increased or reduced.

Major uses are the dominant uses at the time the major part of the fieldwork for this survey was completed.

Major management factors are those factors that affect the use of the soils for the major uses. The soil-related factors are limiting, whereas the climatic factors can be either limiting or nonlimiting. The major management factors may apply to the entire unit or to a given component of the unit.

General management considerations provide additional perspective on the suitability and limitations of the unit for the major uses. They may apply to the entire unit or to a given component of the unit.

Soil Descriptions

1—Ackett extremely gravelly clay loam, 2 to 10 percent slopes

Composition

Ackett soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Figure 5.—Area of Ackett extremely gravelly clay loam, 2 to 10 percent slopes, in foreground.

Setting

Position on landscape: Stream terraces (fig. 5)
Elevation: 4,900 to 5,600 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free season: 90 to 120 days

Characteristics of the Ackett Soil

Typical profile:
0 to 1 inch—pale brown extremely gravelly clay loam
1 inch to 6 inches—light brownish gray and pale brown clay
6 to 8 inches—light gray extremely cobbly clay
8 to 14 inches—very pale brown very gravelly clay loam
14 to 28 inches—white lime- and silica-cemented hardpan
28 to 50 inches—multicolored extremely gravelly sand
50 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Very slow

Available water capacity: 1.5 to 3.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High
Salinity throughout profile: Low or moderate

Contrasting Inclusions

Arbidge soils on lower lying terraces; Chuska and Roseworth soils on higher lying terraces; Lankbush soils on foot slopes; soils that are deep to a hardpan, are loam over clay loam, and are on mounds; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Precipitation, available water capacity, depth to the hardpan, rock fragments in the surface l ayer
Dominant vegetation in natural potential plant community: Thurber needlegrass, black sagebrush
General management considerations:
• Forage production is limited by low precipitation, low available water capacity, and shallow rooting depth.
• Seeding is limited by low precipitation and rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Shallow stony, 8 to 12 inch precipitation zone

2—Ackett extremely gravelly clay loam, 10 to 25 percent slopes

Composition

Ackett soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Stream terraces
Elevation: 4,900 to 5,600 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free season: 90 to 120 days

Characteristics of the Ackett Soil

Typical profile:
0 to 4 inches—light brownish gray extremely gravelly clay loam
4 to 6 inches—pale brown clay
6 to 11 inches—light brownish gray extremely cobbly clay
11 to 22 inches—white lime- and silica-cemented hardpan
22 to 42 inches—multicolored extremely gravelly sand
42 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 1 inch to 2 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High
Salinity throughout profile: Low or moderate

Contrasting Inclusions

Soils that are deep to a hardpan, are loam over clay loam, and are on mounds; Udaho soils in lower lying areas of hillsides

Use and Management

Major use: Rangeland
Major management factors: Precipitation, available water capacity, depth to the hardpan, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, black sagebrush
General management considerations:
• Forage production is limited by low precipitation, low available water capacity, and the shallow rooting depth.
• Seeding is limited by low precipitation, rock fragments in the surface layer, and the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Shallow stony, 8 to 12 inch precipitation zone

3—Aeric Fluvaquents

Composition

Aeric Fluvaquents and similar inclusions—70 percent
Contrasting inclusions—30 percent

Setting

Position on landscape: Flood plains
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 100 to 110 days
Slope range: 0 to 2 percent

Characteristics of the Aeric Fluvaquents

Example profile:
0 to 13 inches—light brownish gray silty clay loam
13 to 18 inches—dark gray silty clay
18 to 60 inches—pale brown loamy sand
Depth class: Very deep
Drainage class: Somewhat poorly drained to very poorly drained
Permeability: Slow or moderate
Available water capacity: 2 to 10 inches
Potential rooting depth: 18 to 36 inches
Runoff: Slow
Hazard of water erosion: Slight
Depth to water table: 6 to 36 inches
Frequency of flooding: Frequent
Shrink-swell potential: High

Contrasting Inclusions

Lankbush soils on foot slopes; soils that are moderately deep to sand and gravel, are silty clay loam, and are on flood plains; soils that are moderately well drained and very deep, are silty clay loam over silty clay, and are on flood plains

Use and Management

Major use: Rangeland
Major management factor: Wetness
Dominant vegetation in natural potential plant community: Slender wheatgrass, foxtail barley, basin wildrye, sedge, willow
General management considerations:

- Forage production and seeding are limited by wetness.
- Grazing should be delayed until the soil is adequately drained and is firm enough to withstand trampling by livestock.

Interpretive Groups

Land capability classification: IVw, nonirrigated
Range site: Because of the variability of these soils, onsite evaluation is necessary to determine the range site in specific areas.

4—Aninto gravelly loam, 1 to 6 percent slopes

Composition

Aninto soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 5,700 to 5,850 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Aninto Soil

Typical profile:
0 to 12 inches—grayish brown gravelly loam
12 to 20 inches—pale brown very gravelly clay
20 to 40 inches—light yellowish brown extremely gravelly silty clay
40 to 53 inches—light yellowish brown very gravelly clay
53 to 69 inches—light yellowish brown extremely gravelly silty clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Brose soils on summits; Howcree and Oshone soils on higher lying terraces; Tucker soils on flood plains; soils that are very deep, are

gravelly loam over gravelly clay, and are on fans and mounds; soils that are poorly drained and very deep, are silt loam over silty clay, and are in depressions of flood plains

Use and Management

Major use: Rangeland
Major management factors: None
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush

Interpretive Groups

Land capability classification: IVe, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

5—Aninto complex, 10 to 30 percent slope

Composition

Aninto soil and similar inclusions—45 percent
Aninto soil, thick surface, and similar inclusions—40 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Aninto soil—convex areas of terraces; Aninto soil, thick surface—concave areas and foot slopes of terraces
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Aninto Soil

Slope range: 10 to 30 percent
Typical profile:
0 to 6 inches—brown very gravelly silty clay loam
6 to 13 inches—brown very gravelly clay
13 to 26 inches—brown very gravelly silty clay
26 to 41 inches—yellowish brown extremely gravelly silty clay
41 to 56 inches—dark yellowish brown clay
56 to 70 inches—brown clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Shrink-swell potential: High

Characteristics of the Aninto Soil, Thick Surface

Slope range: 10 to 20 percent
Typical profile:
0 to 12 inches—grayish brown very gravelly silty clay loam
12 to 33 inches—yellowish brown very gravelly clay
33 to 57 inches—brown extremely gravelly silty clay
57 to 65 inches—brown clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Bancy, Chayson, Forvic, and Oshone soils on terraces

Use and Management

Major use: Rangeland
Major management factors: Depth to the clayey subsoil, hazard of water erosion
Dominant vegetation in natural potential plant community: Aninto soil—Idaho fescue, low sagebrush; Aninto soil, thick surface—Idaho fescue, mountain big sagebrush
General management considerations:
• Forage production and rooting depth are limited by the shallow depth to the clayey subsoil in the Aninto soil.
• Seeding is limited by the hazard of water erosion.

Interpretive Groups

Land capability classification: IVe, nonirrigated
Range site: Aninto soil—Shallow claypan, 12 to 16 inch precipitation zone; Aninto soil, thick surface—Loamy, 13 to 16 inch precipitation zone

6—Antelope Springs loam, 0 to 4 percent slopes

Composition

Antelope Springs soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Alluvial fans and terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Antelope Springs Soil

Typical profile:
0 to 4 inches—pale brown loam
4 to 13 inches—brown clay loam
13 to 60 inches—pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 7 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate
Salinity throughout profile: Moderate

Contrasting Inclusions

Chiara soils on higher lying terraces; Gosinta soils on alluvial terraces; soils that are poorly drained or somewhat poorly drained, are very deep, are loam over clay loam over loam, and are in depressions of terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Precipitation, salinity, hazard of wind erosion
Dominant vegetation in natural potential plant community: Basin wildrye, black greasewood
General management considerations:

- Forage production is limited by low precipitation and soil salinity.
- Seeding is limited by low precipitation, soil salinity, and the moderate hazard of wind erosion.
- Plants that can tolerate the soil salinity should be seeded.
- Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Saline upland, 7 to 12 inch precipitation zone

7—Arbidge sandy loam, 1 to 4 percent slopes

Composition

Arbidge soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 4,500 to 5,500 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Arbidge Soil

Typical profile:
0 to 4 inches—brown sandy loam
4 to 15 inches—yellowish brown and light yellowish brown sandy clay loam
15 to 26 inches—very pale brown sandy loam
26 to 40 inches—intermixed layers of hardpan and very pale brown sandy loam
40 to 65 inches—multicolored extremely gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2.5 to 5.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight

Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Blacknest, Kecko, and Scoon soils on lower lying terraces; Chuska soils on higher lying terraces; Lankbush soils on foot slopes; Udaho soils on hillsides; soils that are moderately deep to a hardpan, are sandy loam over sandy clay, and are on terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, permeability, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderately slow permeability and moderate hazard of wind erosion.
• The application of irrigation water should be adjusted to the intake rate of the soil.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

8—Arness sandy loam, 2 to 6 percent slopes

Composition

Arness soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 5,100 to 5,900 feet
Average annual precipitation: 11 to 13 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Arness Soil

Typical profile:
0 to 2 inches—grayish brown sandy loam
2 to 6 inches—brown loam
6 to 12 inches—brown sandy clay loam
12 to 19 inches—pale brown sandy clay loam
19 to 32 inches—white fractured lime- and silica-cemented hardpan
32 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2.5 to 3.0 inches
Potential rooting depth: 14 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Chuska and Zola soils on lower lying terraces; Lud and Mug soils on higher lying terraces; Tock soils on terraces; soils that are very shallow to a hardpan, are sandy loam over sandy clay loam, and are in elevated eroded areas; areas of Rock outcrop; areas of blowout

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth

to the hardpan, available water capacity, hazard of wind erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, basin big sagebrush
General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by the low precipitation and moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy, 11 to 13 inch precipitation zone

9—Badlands-Kudlac association, 30 to 90 percent slopes

Composition

Badlands and similar inclusions—65 percent
Kudlac soil and similar inclusions—20 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Badlands—slump areas of breaks and areas of breaks that have slopes of more than 60 percent; Kudlac soil—areas of breaks that have slopes of less than 60 percent
Elevation: 2,900 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of Badlands

Slope range: 30 to 90 percent
Texture: Sandy loam to silty clay
Depth to consolidated lake sediment: 0 to 60 inches or more
Vegetation: None

Characteristics of the Kudlac Soil

Slope range: 30 to 60 percent
Typical profile:
0 to 6 inches—light gray silty clay
6 to 24 inches—pale brown silty clay loam
24 to 40 inches—brown silt loam
40 to 60 inches—pale brown silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Very rapid
Hazard of water erosion: Very severe
Hazard of wind erosion: Moderate
Shrink-swell potential: High
Salinity throughout profile: Low or moderate

Contrasting Inclusions

Fathom soils in areas of breaks that have slopes of less than 60 percent; Quincy and Rad soils on terraces; areas of very deep gravelly loam on breaks; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Kudlac soil—Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Most of the available forage is in areas of included soils in and along drainageways.
• Forage production on the Kudlac soil is limited mainly by low precipitation.
• The use of forage by livestock is limited by slope.
• Seeding is limited by the low precipitation, slope, very severe hazard of water erosion, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

10—Bahem silt loam, 1 to 4 percent slopes

Composition

Bahem soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Bahem Soil

Typical profile:
0 to 8 inches—light brownish gray silt loam
8 to 18 inches—pale brown silt loam
18 to 65 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Barrymore, Rad, and Shano soils on lower lying terraces; Dolman, Sluka, and Taunton soils on higher lying terraces; Power and Purdam soils on terraces; Tulch soils on stream terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated

11—Bahem silt loam, 4 to 8 percent slopes

Composition

Bahem soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Bahem Soil

Typical profile:
0 to 9 inches—pale brown silt loam
9 to 22 inches—very pale brown silt loam
22 to 70 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Kecko, Rad, Shano, and Sluka soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.

• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by slope and the moderate hazards of water and wind erosion.
• Regulating the application of irrigation water helps to control runoff and erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

12—Bahem silt loam, 8 to 12 percent slopes

Composition

Bahem soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Bahem Soil

Typical profile:
0 to 10 inches—pale brown silt loam
10 to 28 inches—light gray silt loam
28 to 60 inches—very pale brown very fine sandy loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Sluka soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Because areas of this soil are long and narrow, management is dependent on the major uses of the less sloping, wider surrounding areas.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

13—Banbury loam, 2 to 12 percent slopes

Composition

Banbury soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Banbury Soil

Typical profile:
0 to 5 inches—dark grayish brown and brown loam
5 to 17 inches—brown loam
17 to 19 inches—fractured bedrock
19 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Kecko, Paulville, and Taunton soils on lower lying terraces and on the sides of terraces; soils that are poorly drained, are shallow to bedrock, are loam over clay loam, and are in depressional areas of terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Hayland and pastureland, rangeland
Major management factors: Precipitation, slope, depth to bedrock, available water capacity, hazard of water erosion

Hayland and Pastureland

General management considerations:
• Most climatically suited grasses and legumes can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of forage is limited by slope, shallow rooting depth, and low available water capacity.
• Regulating the application of irrigation water helps to control runoff and erosion.

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, low available water capacity, and shallow rooting depth.
• Seeding is limited by the low precipitation and moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

14—Banbury loam, 12 to 20 percent slopes

Composition

Banbury soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Banbury Soil

Typical profile:
0 to 2 inches—light brownish gray loam
2 to 4 inches—light brownish gray clay loam
4 to 12 inches—light brownish gray loam
12 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Bluegulch soils on ridges and dip slopes; Kecko soils on lower lying terraces; areas of loam that are shallow to bedrock, are poorly drained, and are in slumps; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to bedrock, available water capacity, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

15—Banbury-Rock outcrop complex, 2 to 20 percent slopes

Composition

Banbury soil and similar inclusions—55 percent
Rock outcrop—35 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Banbury Soil

Typical profile:
0 to 4 inches—pale brown loam
4 to 12 inches—pale brown loam
12 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed basalt
Description of areas: Sharp, angular to semirounded, long, narrow lava flow pressure ridges ranging to a semirounded area that extends 1 foot to 10 feet above the adjacent landscape.

Contrasting Inclusions

Barrymore soils on terraces; Kecko, Paulville, Suepert, and Taunton soils on lower lying terraces; saline, somewhat poorly drained loam that is shallow to bedrock and is in depressional areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to bedrock, available water capacity, areas of Rock outcrop, hazard of water erosion
Dominant vegetation in natural potential plant community: Banbury soil—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by the low precipitation, areas of Rock outcrop, and moderate hazard of water erosion.
• The use of equipment is limited by the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Banbury soil—Shallow loamy, 8 to 12 inch precipitation zone

16—Bancy-Tanner complex, 2 to 12 percent slopes

Composition

Bancy soil and similar inclusions—60 percent
Tanner soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Bancy soil—concave to plane areas of terraces; Tanner soil—convex areas of terraces
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Bancy Soil

Slope range: 2 to 12 percent
Typical profile:
0 to 3 inches—brown gravelly clay loam
3 to 8 inches—brown clay
8 to 17 inches—yellowish brown clay
17 to 31 inches—white lime- and silica-cemented hardpan
31 inches—fractured bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2 to 3 inches
Potential rooting depth: 14 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Tanner Soil

Slope range: 2 to 10 percent
Typical profile:
0 to 3 inches—brown silt loam
3 to 16 inches—brown silty clay loam
16 to 22 inches—brown silty clay
22 to 35 inches—pale brown gravelly loam
35 to 51 inches—white fractured lime- and silica-cemented hardpan
51 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Aninto, Chayson, and Oshone soils in convex areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Depth to clayey subsoil, available water capacity, hazard of water erosion
Dominant vegetation in natural potential plant community: Bancy soil—Idaho fescue, low sagebrush; Tanner soil—bluebunch wheatgrass, basin big sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth and low available water capacity of the Bancy soil.
• Rooting depth is limited to the upper part of the Bancy soil because of the claypan.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Bancy soil—Shallow claypan, 12 to 16 inch precipitation zone; Tanner soil—Loamy, 11 to 13 inch precipitation zone

17—Barrymore silt loam, 1 to 4 percent slopes

Composition

Barrymore soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet

Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Barrymore Soil

Typical profile:
0 to 8 inches—pale brown silt loam
8 to 16 inches—pale brown silt loam
16 to 26 inches—very pale brown silt loam
26 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5.0 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Dolman and McCain soils on higher lying terraces; Shano soils on lower lying terraces; Starbuck soils on terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factors: None
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIs, nonirrigated

18—Barrymore-Starbuck complex, 1 to 4 percent slopes

Composition

Barrymore soil and similar inclusions—50 percent
Starbuck soil and similar inclusions—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Barrymore Soil

Typical profile:
0 to 5 inches—yellowish brown silt loam
5 to 17 inches—yellowish brown silt loam
17 to 25 inches—very pale brown silt loam
25 inches—fractured bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5.0 to 8.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight

Characteristics of the Starbuck Soil

Typical profile:
0 to 5 inches—yellowish brown silt loam
5 to 18 inches—yellowish brown and light yellowish brown silt loam
18 inches—fractured bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 3.5 inches
Potential rooting depth: 12 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Hoosegow, McCain, Minveno, Power, and Taunton soils on higher lying terraces; Owinza soils in depressional areas of terraces; Rad soils on lower lying terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation of both soils, depth to bedrock and available water capacity of the Starbuck soil

Rangeland

Dominant vegetation in natural potential plant community: Barrymore soil—Thurber needlegrass, Wyoming big sagebrush; Starbuck soil—bluebunch wheatgrass, Wyoming big sagebrush

General management considerations:
• Forage production is mainly limited by low precipitation and by the shallow rooting depth and low available water capacity of the Starbuck soil.
• Seeding is limited by the low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to the soils in this unit.
• Production of irrigated crops is limited by the shallow rooting depth and low available water capacity of the Starbuck soil.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIc, nonirrigated
Range site: Barrymore soil—Loamy, 8 to 10 inch precipitation zone; Starbuck soil—Shallow loamy, 8 to 12 inch precipitation zone

19—Bluegulch gravelly loam, 2 to 12 percent slopes

Composition

Bluegulch soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Dip slopes, ridges
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Bluegulch Soil

Typical profile:
0 to 4 inches—brown gravelly loam
4 to 12 inches—pale brown gravelly loam
12 to 20 inches—pale brown very gravelly loam
20 to 44 inches—light gray extremely gravelly sandy loam
44 inches—bedrock

Depth class: Deep to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 5.0 inches
Potential rooting depth: 40 to 60 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Bahem, Rakane, and Trevino soils on lower lying terraces; soils that are moderately deep to bedrock, are gravelly loam over very gravelly loam, and are on dip slopes and ridges; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, slope, and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by slope and the moderate hazard of water erosion.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

20—Bluegulch-Rock outcrop complex, 2 to 30 percent slopes

Composition

Bluegulch soil and similar inclusions—60 percent
Rock outcrop—25 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Dip slopes, ridges
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Bluegulch Soil

Typical profile:
0 to 6 inches—light brownish gray gravelly loam
6 to 13 inches—pale brown gravelly loam
13 to 19 inches—pale brown very gravelly loam
19 to 48 inches—very pale brown extremely gravelly sandy loam
48 inches—bedrock
Depth class: Deep to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 5.0 inches
Potential rooting depth: 40 to 60 inches
Runoff: Medium
Hazard of water erosion: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Sharp, angular to semirounded, long, narrow ridges ranging to a semirounded area that extends 1 foot to 10 feet above the adjacent landscape

Contrasting Inclusions

Banbury and Bahem soils on lower lying terraces; soils that are moderately deep to bedrock, are gravelly loam over very gravelly loam, and are on ridges and dip slopes

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Bluegulch soil—Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, the moderate hazard of water erosion, and the areas of Rock outcrop.
• The use of equipment is limited by the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Bluegulch soil—Loamy, 8 to 10 inch precipitation zone

21—Brose-Amboat complex, 2 to 20 percent slopes

Composition

Brose soil and similar inclusions—55 percent
Amboat soil and similar inclusions—35 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Summits (fig. 6)

Figure 6.—Area of Brose-Amboat complex, 2 to 20 percent slopes. Brose soil in foreground and Amboat soil in background.

Elevation: 5,800 to 6,600 feet
Average annual precipitation: 12 to 16 inches

Average annual air temperature: 40 to 44 degrees F
Frost-free season: 70 to 90 days

Characteristics of the Brose Soil

Typical profile:
0 to 1 inch—brown extremely cobbly loam
1 inch to 3 inches—brown gravelly loam
3 to 9 inches—brown gravelly clay loam
9 to 18 inches—brown and reddish brown gravelly clay
18 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 1.5 to 3.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Amboat Soil

Typical profile:
0 to 8 inches—dark brown gravelly loam
8 to 17 inches—dark brown gravelly clay
17 to 60 inches—brown extremely stony clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 3.0 to 4.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Congle soils on foot slopes; Doodlelink and Eep soils on hill slopes and breaks; Oshone soils on lower lying terraces; soils that are very shallow to bedrock, are extremely cobbly loam over gravelly clay, and are on ledges bordering scarp faces; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Brose soil—depth to bedrock, available water capacity, rock fragments in the surface layer, hazard of water erosion; Amboat soil—hazard of water erosion
Dominant vegetation in natural potential plant community: Brose soil—Idaho fescue, low sagebrush; Amboat soil—Idaho fescue, mountain big sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth and low available water capacity of the Brose soil.
• Seeding is limited by the rock fragments in the surface layer of the Brose soil and by the moderate hazard of water erosion on the Amboat and Brose soils.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Brose soil—Shallow claypan, 12 to 16 inch precipitation zone; Amboat soil—Stony loam, 12 to 16 inch precipitation zone

22—Budlewis cobbly silt loam, 2 to 6 percent slopes

Composition

Budlewis soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,300 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Budlewis Soil

Typical profile:
0 to 5 inches—grayish brown cobbly silt loam
5 to 11 inches—brown silty clay loam
11 to 21 inches—pale brown clay
21 to 22 inches—white lime- and silica-cemented hardpan
22 inches—fractured bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 20 to 39 inches
Runoff: Medium

Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Chayson, Howcree, and Tanner soils on higher lying terraces; soils that are very shallow to a hardpan, are very cobbly silt loam over clay, and are on lower lying terraces

Use and Management

Major use: Rangeland
Major management factors: Depth to the clayey subsoil, hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, low sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth.
• Plant rooting depth is limited to the upper part of the soil because of the claypan.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Shallow claypan, 12 to 16 inch precipitation zone

23—Budlewis-Chayson complex, 2 to 6 percent slopes

Composition

Budlewis soil and similar inclusions—60 percent
Chayson soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Budlewis soil—concave to plane areas of terraces; Chayson soil—convex areas of terraces
Elevation: 5,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 46 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Budlewis Soil

Typical profile:
0 to 3 inches—grayish brown silt loam
3 to 10 inches—brown silty clay loam
10 to 21 inches—pale brown clay
21 to 26 inches—light yellowish brown clay loam
26 to 38 inches—white lime- and silica-cemented hardpan
38 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 20 to 39 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Chayson Soil

Typical profile:
0 to 4 inches—dark grayish brown loam
4 to 22 inches—grayish brown and brown clay loam
22 to 29 inches—very pale brown gravelly loam
29 to 60 inches—white lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Brose soils on summits; Howcree soils in concave to plane areas of terraces, Tanner soils on lower lying terraces; soils that are shallow to a hardpan, are very cobbly silt loam over silty clay, and are on lower lying terraces; soils that are shallow to bedrock, are silt loam over silty clay, and are on higher lying terraces

Use and Management

Major use: Rangeland
Major management factors: Budlewis soil—depth to the clayey subsoil, hazard of water erosion; Chayson soil—hazard of water erosion

Dominant vegetation in natural potential plant community: Budlewis soil—Idaho fescue, low sagebrush; Chayson soil—Idaho fescue, mountain big sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth of the Budlewis soil.
• Plant rooting depth is limited to the upper part of the Budlewis soil because of the claypan.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Budlewis soil—Shallow claypan, 12 to 16 inch precipitation zone; Chayson soil—Loamy, 13 to 16 inch precipitation zone

24—Budlewis-Tanner complex, 2 to 6 percent slopes

Composition

Budlewis soil and similar inclusions—60 percent
Tanner soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Budlewis soil—concave areas of terraces; Tanner soil—convex areas of terraces
Elevation: 5,300 to 6,000 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Budlewis Soil

Typical profile:
0 to 4 inches—brown silt loam
4 to 11 inches—grayish brown silty clay loam
11 to 19 inches—pale brown silty clay
19 to 27 inches—very pale brown silty clay loam
27 to 31 inches—pale brown silty clay loam
31 to 36 inches—white lime- and silica-cemented hardpan
36 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 20 to 39 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Tanner Soil

Typical profile:
0 to 3 inches—brown silt loam
3 to 16 inches—grayish brown or brown silty clay loam
16 to 22 inches—pale brown silty clay
22 to 35 inches—very pale brown gravelly loam
35 to 51 inches—white fractured lime- and silica-cemented hardpan
51 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Chayson, Howcree, and Iwica soils on higher lying terraces; soils that are shallow to a duripan, are very cobbly sandy loam over very gravelly sandy clay loam, and are on higher lying terraces; soils that are shallow to bedrock, are very gravelly loam over extremely gravelly clay, and are in concave areas of terraces; soils that are moderately deep to a hardpan, are silt loam over silty clay loam, and are in convex areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Budlewis soil—depth to the clayey subsoil, hazard of water erosion; Tanner soil—hazard of water erosion
Dominant vegetation in natural potential plant community: Budlewis soil—Idaho fescue, low sagebrush; Tanner soil—bluebunch wheatgrass, basin big sagebrush
General management considerations:

• Forage production is limited by the shallow rooting depth of the Budlewis soil.
• Plant rooting depth is limited to the upper part of the Budlewis soil because of the claypan.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Budlewis soil—Shallow claypan, 12 to 16 inch precipitation zone; Tanner soil—Loamy, 11 to 13 inch precipitation zone

25—Chiara silt loam, 1 to 8 percent slopes

Composition

Chiara soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,600 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 130 days

Characteristics of the Chiara Soil

Typical profile:
0 to 3 inches—pale brown silt loam
3 to 9 inches—light yellowish brown silt loam
9 to 17 inches—white silt loam
17 to 49 inches—white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Bahem and Rad soils on lower lying terraces; Chuska, Colthorp, and Roseworth soils on higher lying terraces; Dolman, Portneuf, and Sluka soils on terraces; Tulch soils on stream terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of water erosion, slope

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by the low precipitation and moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

26—Chuska loam, 1 to 10 percent slopes

Composition

Chuska soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 5,000 feet
Average annual precipitation: 9 to 10 inches

Average annual air temperature: 49 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Chuska Soil

Typical profile:
0 to 3 inches—pale brown loam
3 to 10 inches—very pale brown gravelly loam
10 to 16 inches—very pale brown very gravelly loam
16 to 60 inches—white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Potential rooting depth: 12 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Blacknest soils on higher lying terraces, Bluegulch soils on dip slopes and ridges, Dolman soils on terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, permeability, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, slope, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

27—Chuska gravelly loam, 2 to 12 percent slopes

Composition

Chuska soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces, dip slopes, ridges
Elevation: 4,500 to 5,700 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Chuska Soil

Typical profile:
0 to 3 inches—pale brown gravelly loam
3 to 10 inches—pale brown clay loam
10 to 14 inches—very pale brown gravelly clay loam
14 to 18 inches—white lime- and silica-cemented hardpan
18 to 51 inches—very pale brown extremely gravelly sandy loam
51 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Potential rooting depth: 12 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Ackett soils on stream terraces; Arbidge, Lankbush, and Rogerson soils on lower lying terraces; Nawt and Stricker soils on breaks; soils that are shallow to a hardpan, are loam underlain by sand and gravel, and are on terraces; soils that are moderately deep to a hardpan, are gravelly loam over gravelly clay loam, and are on terraces; areas of Rock outcrop; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, permeability, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, slope, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIs, nonirrigated, and IVe, irrigated
Range site: Loamy, 8 to 12 inch precipitation zone

28—Chuska very stony loam, 2 to 12 percent slopes

Composition

Chuska soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces and ridges
Elevation: 4,500 to 5,400 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Chuska Soil

Typical profile:
0 to 3 inches—pale brown very stony loam
3 to 10 inches—brown clay loam
10 to 16 inches—very pale brown sandy clay loam
16 to 28 inches—white lime- and silica-cemented hardpan
28 to 45 inches—very pale brown extremely stony sandy loam
45 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 3 inches
Potential rooting depth: 12 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Ackett soils on stream terraces; Chiara soils on lower lying terraces; soils that are very shallow to a hardpan, are very stony loam over clay loam, and are on ridges; soils that are moderately deep to a hardpan, are

gravelly loam over gravelly clay loam, and are on terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by the low precipitation, rock fragments in the surface layer, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

29—Colthorp cobbly silt loam, 1 to 4 percent slopes

Composition

Colthorp soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 4,200 to 4,700 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Colthorp Soil

Typical profile:
0 to 3 inches—pale brown cobbly silt loam
3 to 11 inches—very pale brown silt loam
11 to 18 inches—very pale brown gravelly silt loam
18 to 24 inches—white lime- and silica-cemented hardpan
24 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Chiara and Scoon soils on lower lying terraces, Chuska soils on higher lying terraces, areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, permeability

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years of below average precipitation during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the shallow rooting depth and low available water capacity.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

30—Colthorp very cobbly silt loam, 1 to 15 percent slopes

Composition

Colthorp soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 4,200 to 4,700 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Colthorp Soil

Typical profile:
0 to 4 inches—light brownish gray very cobbly silt loam
4 to 9 inches—pale brown silt loam
9 to 19 inches—light brownish gray gravelly silt loam
19 to 28 inches—white lime- and silica-cemented hardpan
28 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Chiara soils on lower lying terraces, Chuska soils on higher lying terraces, areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, rock fragments in the surface layer
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
- Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
- Seeding is limited by the low precipitation and rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

31—Congle gravelly loam, 8 to 30 percent slopes

Composition

Congle soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Back slopes and foot slopes
Elevation: 4,800 to 6,400 feet
Average annual precipitation: 13 to 20 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 80 to 100 days

Characteristics of the Congle Soil

Typical profile:
0 to 4 inches—dark brown gravelly loam
4 to 11 inches—dark brown gravelly loam
11 to 42 inches—dark brown gravelly clay loam
42 to 62 inches—light yellowish brown gravelly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8 to 9 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Amboat and Brose soils on summits, Doodlelink and Eep soils on breaks, Isknat soils on fan terraces, Oshone soils on lower lying

terraces, areas of Rock outcrop, outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factor: Hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management consideration:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IIIe, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

32—Dehana-Rock outcrop complex, 4 to 40 percent slopes

Composition

Dehana soil and similar inclusions—60 percent
Rock outcrop—20 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Breaks and hill slopes
Elevation: 5,800 to 7,600 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 40 to 42 degrees F
Frost-free season: 20 to 60 days

Characteristics of the Dehana Soil

Typical profile:
0 to 6 inches—very dark grayish brown gravelly loam
6 to 15 inches—dark grayish brown gravelly loam
15 to 30 inches—brown gravelly loam
30 to 65 inches—brown gravelly clay loam
65 to 70 inches—yellowish brown silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 7.0 to 8.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Semirounded, weathered cliffs and rimrock that border narrow, lower lying valley terraces; large semirounded fragments randomly deposited downslope; and climatically sculptured areas along foot slopes

Contrasting Inclusions

Eep and Kavon soils on breaks and hill slopes, Hogmalat soils on shoulders and summits, Keman soils on summits, Rutherford soils on ridges and dip slopes

Use and Management

Major use: Rangeland
Major management factors: Growing season, slope, areas of Rock outcrop, hazard of water erosion
Dominant vegetation in natural potential plant community: Dehana soil—needlegrass, quaking aspen
General management considerations:
• Forage production is limited by the short growing season.
• Seeding is limited by slope, the areas of Rock outcrop, and the moderate hazard of water erosion.
• The use of equipment is limited by slope and the areas of Rock outcrop.
• Because cold soil temperatures limit plant growth, grazing should be delayed until the soil has warmed up and the forage plants have achieved sufficient growth.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Dehana soil—Aspen woodland, 16+ inch precipitation zone

33—Dolman silt loam, 1 to 4 percent slopes

Composition

Dolman soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Dolman Soil

Typical profile:
0 to 21 inches—pale brown silt loam
21 to 27 inches—light gray loam
27 to 45 inches—white lime- and silica-cemented hardpan
45 to 61 inches—sand and gravel
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4.0 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Chiara soils on higher lying terraces; Paulville, Purdam, and Shano soils on lower lying terraces; Scoon soils adjacent to breaks

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factor: Precipitation

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIs, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

34—Doodlelink very gravelly loam, 8 to 30 percent slopes

Composition

Doodlelink soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Breaks
Elevation: 4,800 to 6,400 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 80 to 100 days

Characteristics of the Doodlelink Soil

Typical profile:
0 to 15 inches—dark grayish brown very gravelly loam
15 to 26 inches—brown very gravelly loam
26 to 60 inches—pale brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Congle soils on foot slopes; Gosinta and Tucker soils on alluvial terraces; Stricker soils on south- and west-facing breaks; soils that are very deep, are very gravelly loam over very gravelly clay, and are in slump areas; soils that are moderately deep to bedrock, are very gravelly loam, and are on breaks; areas of Rock outcrop; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management consideration:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Stony loam, 12 to 16 inch precipitation zone

35—Doodlelink very gravelly loam, 30 to 75 percent slopes

Composition

Doodlelink soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Breaks
Elevation: 4,800 to 6,400 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 80 to 100 days

Characteristics of the Doodlelink Soil

Typical profile:
0 to 6 inches—dark grayish brown very gravelly loam
6 to 21 inches—dark brown and brown very gravelly loam
21 to 65 inches—yellowish brown and brown extremely gravelly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe

Contrasting Inclusions

Congle soils on foot slopes; Gosinta and Tucker soils on alluvial terraces; Nawt and Stricker soils on west- and south-facing breaks; soils that are very deep, are very gravelly loam over very gravelly clay, and are in slump areas; soils that are moderately deep to bedrock, are very gravelly loam, and are on breaks; areas of Rock outcrop; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Slope, hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management considerations:
• The use of forage by livestock is limited by slope.
• Seeding is limited by slope and the severe hazard of water erosion.
• The use of equipment is limited by slope.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: North slope stony, 12 to 16 inch precipitation zone

36—Eep very cobbly sandy loam, 6 to 35 percent slopes

Composition

Eep soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Breaks and hill slopes
Elevation: 5,800 to 6,500 feet
Average annual precipitation: 16 to 20 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free season: 60 to 100 days

Characteristics of the Eep Soil

Typical profile:
0 to 9 inches—dark grayish brown very cobbly sandy loam

9 to 17 inches—brown very gravelly clay loam
17 to 26 inches—brown very gravelly loam
26 to 38 inches—pale brown very cobbly sandy loam
38 to 76 inches—white unconsolidated loamy sand volcanic ash
76 to 78 inches—very pale brown consolidated volcanic ash

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Congle soils on foot slopes, Dehana soils on breaks and hill slopes, Mug soils on higher lying terraces, very deep sandy loam on breaks and hill slopes, areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Rock fragments in the surface layer, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush, antelope bitterbrush
General management considerations:
• Seeding is limited by the rock fragments in the surface layer and the moderate hazards of water and wind erosion.
• The use of equipment is limited by the rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy slope, 12 to 16 inch precipitation zone

37—Eep-Dehana-Rock outcrop association, 6 to 40 percent slopes

Composition

Eep soil and similar inclusions—35 percent
Dehana soil and similar inclusions—25 percent
Rock outcrop—20 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Eep soil—west and south aspects of breaks and hill slopes, Dehana soil—north and east aspects of breaks and hill slopes
Elevation: 6,200 to 7,000 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free season: 30 to 80 days

Characteristics of the Eep Soil

Typical profile:
0 to 5 inches—dark grayish brown very cobbly sandy loam
5 to 26 inches—grayish brown and dark grayish brown very cobbly loam
26 to 38 inches—brown very cobbly sandy loam
38 to 65 inches—light gray unconsolidated loamy sand volcanic ash

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Characteristics of the Dehana Soil

Typical profile:
0 to 6 inches—very dark grayish brown gravelly loam
6 to 17 inches—dark grayish brown gravelly loam
17 to 32 inches—brown gravelly loam
32 to 60 inches—pale brown cobbly loam

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 7.0 to 8.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Semirounded, weathered

cliffs and rimrock that border narrow, lower lying valley terraces; large semirounded fragments randomly deposited downslope; and climatically sculptured areas along foot slopes

Contrasting Inclusions

Kavon soils on hill slopes, Keman and Hogmalat soils on summits, Rutherford soils on ridges and dip slopes

Use and Management

Major use: Rangeland
Major management factors: Dehana soil—growing season, slope, hazard of water erosion, areas of Rock outcrop; Eep soil—rock fragments in the surface layer, slope, hazards of wind and water erosion; areas of Rock outcrop
Dominant vegetation in natural potential plant community: Eep soil—Idaho fescue, mountain big sagebrush, antelope bitterbrush; Dehana soil—needlegrass, quaking aspen
General management considerations:
• Forage production is limited by the short growing season of the Dehana soil.
• Because cold soil temperatures limit plant growth, grazing should be delayed until the Dehana soil has warmed and the forage plants have achieved sufficient growth.
• Seeding is limited by the rock fragments in the surface layer of the Eep soil, the moderate hazard of wind erosion on the Eep soil, slope, areas of Rock outcrop, and moderate hazard of water erosion.
• The use of equipment is limited by slope and the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Eep soil—Loamy slope, 12 to 16 inch precipitation zone; Dehana soil—Aspen woodland, 16+ inch precipitation zone

38—Eep-Dehana-Rock outcrop association, 40 to 75 percent slopes

Composition

Eep soil and similar inclusions—40 percent
Dehana soil and similar inclusions—25 percent
Rock outcrop—15 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Breaks
Elevation: 6,200 to 7,000 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free season: 30 to 80 days

Characteristics of the Eep Soil

Typical profile:
0 to 10 inches—dark grayish brown very cobbly sandy loam
10 to 23 inches—dark grayish brown very gravelly clay loam
23 to 29 inches—yellowish brown very gravelly sandy loam
29 to 34 inches—yellowish brown extremely gravelly sandy loam
34 to 60 inches—unconsolidated loamy sand volcanic ash
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Characteristics of the Dehana Soil

Typical profile:
0 to 4 inches—very dark grayish brown gravelly loam
4 to 25 inches—very dark grayish brown cobbly loam
25 to 40 inches—brown cobbly loam
40 to 50 inches—brown gravelly clay loam
50 to 60 inches—pale brown gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 7.0 to 8.5 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Semirounded, weathered

cliffs and rimrock that border narrow, lower lying valley terraces; large semirounded fragments randomly deposited downslope; and climatically sculptured areas along foot slopes

Contrasting Inclusions

Kavon soils on hill slopes, Keman soils on summits, Hogmalat soils on summits and shoulders, Rutherford soils on ridges and dip slopes

Use and Management

Major use: Rangeland
Major management factors: Dehana soil—growing season; slope, hazard of water erosion, areas of Rock outcrop; Eep soil—rock fragments in the surface layer, hazards of wind and water erosion, slope, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Eep soil—Idaho fescue, mountain big sagebrush, antelope bitterbrush; Dehana soil—needlegrass, quaking aspen
General management considerations:
• Forage production is limited by the short growing season of the Dehana soil.
• The use of forage by livestock is limited by slope, rock fragments in the surface layer of the Eep soil, and areas of Rock outcrop.
• Seeding is limited by the areas of Rock outcrop, rock fragments in the surface layer of the Eep soil, slope, the moderate hazard of wind erosion on the Eep soil, and the severe hazard of water erosion on the Dehana and Eep soils.
• The use of equipment is limited by the areas of Rock outcrop and slope.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Eep soil—Loamy slope, 12 to 16 inch precipitation zone; Dehana soil—Aspen woodland, 16+ inch precipitation zone

39—Elhina very gravelly loam, 2 to 6 percent slopes

Composition

Elhina soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 5,200 to 5,800 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free season: 85 to 95 days

Characteristics of the Elhina Soil

Typical profile:
0 to 1 inch—grayish brown very gravelly loam
1 inch to 3 inches—light brownish gray gravelly clay loam
3 to 8 inches—brown clay
8 to 12 inches—light yellowish brown clay
12 to 21 inches—pale brown extremely gravelly loam
21 to 32 inches—white fractured lime- and silica-cemented hardpan
32 to 60 inches—brownish yellow weakly cemented extremely gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Contrasting Inclusions

Ackett soils on stream terraces; Aninto soils on the sides of terraces; Howcree and Oshone soils on higher lying terraces and fans; Isknat soils on fan terraces; Tucker soils on lower lying terraces; very deep, poorly drained soils that are silt loam over silty clay and are in depressional areas of alluvial fans and in drainageways

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer, depth to the clayey subsoil
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, black sagebrush
General management considerations:
• Forage production is limited by the low precipitation and shallow rooting depth.

• Plant rooting depth is limited to the upper part of the soil because of the claypan.
• Seeding is limited by the low precipitation and rock fragments in the surface layer.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Shallow calcareous loam, 10 to 16 inch precipitation zone

40—Elijah silt loam, 2 to 4 percent slopes

Composition

Elijah soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 4,600 to 5,200 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Elijah Soil

Typical profile:
0 to 3 inches—pale brown silt loam
3 to 10 inches—pale brown silty clay loam
10 to 23 inches—very pale brown silt loam
23 to 27 inches—white lime- and silica-cemented hardpan
27 to 32 inches—light yellowish brown sandy loam
32 to 60 inches—white lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 8 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Owsel, Minidoka, and Sluka soils on terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the moderate hazard of water erosion.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IIIs, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

41—Elijah-Pigtail complex, 1 to 6 percent slopes

Composition

Elijah soil and similar inclusions—60 percent
Pigtail soil and similar inclusions—25 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Elijah soil—convex areas of terraces, Pigtail soils—concave areas of terraces
Elevation: 4,600 to 5,200 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Elijah Soil

Slope range: 1 to 6 percent
Typical profile:
0 to 3 inches—pale brown silt loam
3 to 14 inches—pale brown silty clay loam
14 to 38 inches—very pale brown loam
38 to 60 inches—white fractured lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 8 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Pigtail Soil

Slope range: 1 to 3 percent
Typical profile:
0 to 3 inches—pale brown silt loam
3 to 7 inches—pale brown silty clay loam
7 to 15 inches—pale brown silty clay
15 to 31 inches—very pale brown silt loam
31 to 60 inches—white fractured lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 5.5 to 7.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Contrasting Inclusions

Owsel, Power, Roseworth, and Tanner soils in concave areas of terraces; soils that are moderately deep to a hardpan, are silt loam over silty clay, and are in depressional areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Elijah soil—hazard of water erosion, precipitation; Pigtail soil—depth to the clayey subsoil, precipitation
Dominant vegetation in natural potential plant community: Elijah soil—bluebunch wheatgrass, Wyoming big sagebrush; Pigtail soil—Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation and the shallow rooting depth of the Pigtail soil.
• Plant rooting depth is limited to the upper part of the Pigtail soil because of the claypan.
• Seeding is limited by low precipitation and the moderate hazard of water erosion on the Elijah soil.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Elijah soil—Loamy, 8 to 12 inch precipitation zone; Pigtail soil—Slick spot sodic, 8 to 14 inch precipitation zone

42—Fathom loamy fine sand, 0 to 12 percent slopes

Composition

Fathom soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Alluvial fans and terraces
Elevation: 3,000 to 3,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Fathom Soil

Typical profile:
0 to 9 inches—brown loamy fine sand
9 to 60 inches—pale brown loamy fine sand

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Available water capacity: 5.5 to 6.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Banbury and Kecko soils on higher lying terraces; very deep, poorly drained soils that are loamy fine sand and are in depressional areas of foot slopes; undulating sand dunes along the Snake River

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of wind erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

43—Fathom loamy fine sand, 30 to 60 percent slopes

Composition

Fathom soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Breaks
Elevation: 3,000 to 3,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Fathom Soil

Typical profile:
0 to 14 inches—brown loamy fine sand
14 to 24 inches—pale brown loamy fine sand
24 to 60 inches—light gray loamy fine sand
Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Available water capacity: 5.5 to 6.0 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Severe

Contrasting Inclusions

Kudlac soils on breaks, very deep soils that are loamy sand over clay and are on breaks

Use and Management

Major use: Rangeland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• The use of forage by livestock is limited by slope.
• Seeding is limited by low precipitation, slope, and the severe hazards of water and wind erosion.
• The use of equipment is limited by slope.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

44—Fathom bouldery loamy fine sand, 2 to 20 percent slopes

Composition

Fathom soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Alluvial fans and terraces
Elevation: 3,000 to 3,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Fathom Soil

Typical profile:
0 to 12 inches—brown bouldery loamy fine sand
12 to 60 inches—pale brown loamy fine sand
Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Available water capacity: 5.5 to 6.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Banbury and Kecko soils on higher lying terraces; very deep, poorly drained loamy sand, in depressional areas of alluvial fans and terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer, hazard of wind erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, rock fragments in the surface layer, and the severe hazard of wind erosion.
• The use of equipment is limited by rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

45—Forvic silty clay loam, 2 to 6 percent slopes

Composition

Forvic soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,800 to 6,200 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 41 to 43 degrees F
Frost-free season: 80 to 90 days

Characteristics of the Forvic Soil

Typical profile:
0 to 7 inches—dark grayish brown silty clay loam
7 to 12 inches—brown clay
12 to 21 inches—dark brown gravelly clay
21 to 30 inches—light brown very gravelly sandy clay
30 to 35 inches—white lime- and silica-cemented hardpan
35 inches—very pale brown welded volcanic ash
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Aninto soils on lower lying terraces; Brose soils on summits; Eep soils on hill slopes; Howcree soils on higher lying terraces; soils that are very deep, are very gravelly silty clay loam over very gravelly silty clay, and are on the sides of terraces; soils that are deep to a hardpan, are silty clay loam over gravelly clay, and are on terraces

Use and Management

Major use: Rangeland
Major management factor: Hazard of water erosion

Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management considerations:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVe, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

46—Gosinta silt loam, 0 to 2 percent slopes

Composition

Gosinta soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Alluvial terraces
Elevation: 3,000 to 5,000 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Gosinta Soil

Typical profile:
0 to 2 inches—dark grayish brown silt loam
2 to 24 inches—grayish brown silt loam
24 to 38 inches—light brownish gray loam
38 to 50 inches—pale brown sandy loam
50 to 65 inches—grayish brown very gravelly sandy loam
Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Depth to water table: 24 to 48 inches
Frequency of flooding: Rare
Shrink-swell potential: Moderate

Contrasting Inclusions

Antelope Springs, Bahem, and Paniogue soils on higher lying terraces; soils that are very deep and poorly drained, are loam over clay loam over loam, and are on alluvial terraces; very deep sandy loam on alluvial terraces; soils that are very deep, are clay loam over clay, and are on alluvial terraces

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, permeability

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Rangeland

Dominant vegetation in natural potential plant community: Basin wildrye, basin big sagebrush
General management considerations:
• Forage production and seeding are limited by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated
Range site: Loamy bottom, 8 to 14 inch precipitation zone

47—Harsan fine sandy loam, 1 to 4 percent slopes

Composition

Harsan soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Harsan Soil

Typical profile:
0 to 11 inches—pale brown fine sandy loam
11 to 23 inches—pale brown sandy loam
23 to 29 inches—pale brown sandy clay loam
29 to 37 inches—very pale brown sandy clay loam
37 to 52 inches—very pale brown silt loam
52 to 60 inches—very pale brown lime- and silica-cemented hardpan
Depth class: Deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 7 to 8 inches
Potential rooting depth: 40 to 60 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Arbidge, Emberton, Jestrick, Sidlake, and Taunton soils on terraces; Shano soils on higher lying terraces; soils that are shallow to bedrock, are loamy fine sand over fine sandy loam, and are on terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factors: Permeability, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIe, nonirrigated

48—Harsan-Sidlake-Quincy complex, 1 to 8 percent slopes

Composition

Harsan soil and similar inclusions—35 percent
Sidlake soil and similar inclusions—25 percent
Quincy soil and similar inclusions—20 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Harsan soil—plane areas of terraces, Sidlake and Quincy soils—concave areas of terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Harsan Soil

Typical profile:
0 to 4 inches—brown loamy sand
4 to 9 inches—brown loamy fine sand
9 to 19 inches—yellowish brown sandy loam
19 to 34 inches—light yellowish brown sandy clay loam
34 to 54 inches—very pale brown clay loam
54 to 60 inches—very pale brown lime- and silica-cemented hardpan
Depth class: Deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5.5 to 8.5 inches
Potential rooting depth: 40 to 60 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe
Shrink-swell potential: Moderate

Characteristics of the Sidlake Soil

Typical profile:
0 to 12 inches—brown and yellowish brown loamy fine sand
12 to 32 inches—yellowish brown sandy clay loam
32 inches—bedrock
Depth class: Moderately deep to bedrock

Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 6.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe
Shrink-swell potential: Moderate

Characteristics of the Quincy Soil

Typical profile:
0 to 6 inches—pale brown loamy sand
6 to 42 inches—pale brown loamy sand
42 to 48 inches—pale brown clay loam
48 to 52 inches—very pale brown clay loam
52 to 65 inches—white lime- and silica-cemented hardpan
Depth class: Deep to a hardpan
Drainage class: Excessively drained
Permeability: Rapid in the upper 42 inches, moderately slow below
Available water capacity: 6 to 7 inches
Potential rooting depth: 40 to 60 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Kecko and Emberton soils in plane areas of terraces; very deep soils that are sandy loam over sandy clay loam over clay loam and are in concave areas of terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Harsan and Sidlake soils—permeability; Harsan, Quincy, and Sidlake soils—slope, precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is suited to this unit.
• Because the permeability of the Harsan and Sidlake soils is moderately slow, the application of irrigation water should be adjusted to the water intake rate.
• The production of irrigated crops is limited by slope and the severe hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

49—Hogmalat-Rock outcrop complex, 3 to 40 percent slopes

Composition

Hogmalat soil and similar inclusions—50 percent
Rock outcrop—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Summits and shoulders
Elevation: 6,800 to 7,600 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 36 to 39 degrees F
Frost-free season: 20 to 50 days

Characteristics of the Hogmalat Soil

Typical profile:
0 to 3 inches—brown extremely gravelly loam
3 to 15 inches—brown very gravelly clay loam
15 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained

Permeability: Moderately slow
Available water capacity: 1.0 to 2.5 inches
Potential rooting depth: 9 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Climatically sculptured areas ranging from flat, irregularly shaped plates that are level with the surrounding landscape to large outcroppings that are 10 to 20 feet high and as much as 30 feet in diameter

Contrasting Inclusions

Kavon soils on hill slopes; Keman soils on summits; Rutherford soils on ridges; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Growing season, depth to bedrock, available water capacity, rock fragments in the surface layer, slope, hazard of water erosion, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Hogmalat soil—bluegrass, curlleaf mountainmahogany
General management considerations:
• Forage production is limited by the short growing season, shallow rooting depth, and low available water capacity.
• Because cold soil temperatures limit plant growth, grazing should be delayed until the soil has warmed up and the forage plants have achieved sufficient growth.
• Seeding is limited by rock fragments in the surface layer, areas of Rock outcrop, slope, and the moderate hazard of water erosion.
• The use of equipment is limited by the areas of Rock outcrop, rock fragments in the surface layer, and slope.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Mahogany savannah, 16 to 22 inch precipitation zone

50—Hoosegow-Sidlake-Rock outcrop complex, 2 to 15 percent slopes

Composition

Hoosegow soil and similar inclusions—45 percent
Sidlake soil and similar inclusions—20 percent
Rock outcrop—15 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Hoosegow soil—concave areas of terraces, Sidlake soil—convex areas of terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Hoosegow Soil

Typical profile:
0 to 6 inches—brown loam
6 to 35 inches—yellowish brown loam
35 to 62 inches—light yellowish brown loam
62 to 72 inches—yellowish brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 9.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Sidlake Soil

Typical profile:
0 to 12 inches—yellowish brown loam
12 to 32 inches—light yellowish brown loam
32 inches—fractured bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 6.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed basalt
Description of areas: Sharp, angular to semirounded, long, narrow ridges ranging to semirounded areas that extend 1 foot to 10 feet above the adjacent landscape

Contrasting Inclusions

Banbury, Barrymore, Emberton, and Power soils on higher lying terraces; Harsan, Kecko and McCain soils in concave areas of terraces; Owinza soils in depressional areas of terraces

Use and Management

Major uses: Rangeland
Major management factors: Sidlake soil—permeability; Hoosegow and Sidlake soils—slope, hazard of water erosion, precipitation, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Hoosegow soil—basin wildrye, basin big sagebrush; Sidlake soil—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by the low precipitation, areas of Rock outcrop, and moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Hoosegow soil—Loamy bottom, 8 to 14 inch precipitation zone; Sidlake soil—Loamy, 8 to 12 inch precipitation zone

51—Howcree-Ibola complex, 2 to 6 percent slopes

Composition

Howcree soil and similar inclusions—45 percent
Ibola soil and similar inclusions—40
Contrasting inclusions—15 percent

Setting

Position on landscape: Howcree soil—plane and concave areas of terraces; Ibola soil—convex areas of terraces
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Howcree Soil

Typical profile:
0 to 4 inches—dark grayish brown loam
4 to 11 inches—grayish brown gravelly clay loam
11 to 19 inches—brown gravelly clay
19 to 30 inches—pale brown very gravelly clay
30 to 60 inches—light yellowish brown extremely gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 4.5 to 6.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Characteristics of the Ibola Soil

Typical profile:
0 to 4 inches—brown loam
4 to 8 inches—dark grayish brown loam
8 to 18 inches—grayish brown clay loam
18 to 27 inches—light brown gravelly loam
27 to 28 inches—white silica-cemented hardpan
28 to 64 inches—light brown semiconsolidated volcanic ash
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 7.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Bancy and Budlewis soils on higher lying terraces; Eep soils on hill slopes; soils that are shallow to a hardpan, are loam over clay loam, and are in convex areas of terraces

Use and Management

Major use: Rangeland
Major management factors: None
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

52—Hutton mucky peat, 0 to 2 percent slopes

Composition

Hutton soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Flood plains
Elevation: 5,500 to 5,800 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 44 to 46 degrees F
Frost-free season: 50 to 90 days

Characteristics of the Hutton Soil

Typical profile:
0 to 2 inches—mucky peat organic mat
2 to 14 inches—very dark gray silty clay loam
14 to 41 inches—gray silty clay loam
41 to 50 inches—gray clay
50 to 62 inches—light gray clay loam
Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Available water capacity: 9 to 11 inches
Potential rooting depth: 24 to 36 inches
Runoff: Slow
Hazard of water erosion: Slight
Depth to water table: 12 to 24 inches
Frequency of flooding: Occasional
Shrink-swell potential: High

Contrasting Inclusions

Eep soils on hill slopes, Tucker soils on higher lying terraces

Use and Management

Major uses: Rangeland
Major management factors: Wetness, flooding
Dominant vegetation in natural potential plant community: Sedge, slender wheatgrass
General management considerations:
• Plants that tolerate wetness are suitable for seeding.
• Grazing should be delayed until the soil is adequately drained and is firm enough to withstand tramping by livestock.

Interpretive Groups

Land capability classification: IVw, nonirrigated
Range site: Semi-wet meadow

53—Isknat loam, 2 to 8 percent slopes

Composition

Isknat soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Alluvial fans
Elevation: 5,800 to 5,900 feet
Average annual precipitation: 15 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 80 to 90 days

Characteristics of the Isknat Soil

Typical profile:
0 to 4 inches—dark grayish brown loam
4 to 16 inches—dark grayish brown gravelly loam
16 to 25 inches—brown very gravelly clay
25 to 43 inches—brown extremely gravelly clay
43 to 60 inches—strong brown clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more

Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Amboat and Brose soils on summits; Dehana and Eep soils on hill slopes; Howcree soils on higher lying terraces; Oshone and Tucker soils on lower lying terraces; very deep soils that are sandy loam over sandy clay loam over sandy loam and are on hill slopes; very deep, poorly drained soils that are silt loam over silty clay and are in depressional areas of lower lying terraces

Use and Management

Major use: Rangeland
Major management factor: Hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management consideration:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVc, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

54—Isknat gravelly loam, 3 to 15 percent slopes

Composition

Isknat soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Fan terraces
Elevation: 5,200 to 5,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 80 to 90 days

Characteristics of the Isknat Soil

Typical profile:
0 to 8 inches—gray gravelly loam
8 to 14 inches—dark grayish brown very gravelly clay loam
14 to 23 inches—dark grayish brown very gravelly clay
23 to 38 inches—pale brown extremely gravelly clay
38 to 60 inches—pale brown extremely gravelly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Oshone soils on higher lying terraces; Tucker soils on lower lying terraces; very deep soils that are loam over clay loam over clay and are on fan terraces; very deep, poorly drained soils that are silt loam over silty clay and are in depressional areas of alluvial terraces

Use and Management

Major use: Rangeland
Major management factor: Hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management consideration:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVc, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

55—Iwica-Budlewis complex, 2 to 6 percent slopes

Composition

Iwica soil and similar inclusions—65 percent
Budlewis soil and similar inclusions—25 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Iwica soil—convex areas of terraces; Budlewis soil—plane to concave areas of terraces

Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Iwica Soil

Typical profile:
0 to 5 inches—dark grayish brown silt loam
5 to 12 inches—grayish brown silty clay loam
12 to 30 inches—brown and pale brown clay
30 to 42 inches—very pale brown gravelly loam
42 to 60 inches—white lime- and silica-cemented hardpan over cemented sand and gravel
Depth class: Deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 5 to 6 inches
Potential rooting depth: 40 to 60 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Characteristics of the Budlewis Soil

Typical profile:
0 to 4 inches—grayish brown silt loam
4 to 19 inches—light brownish gray and grayish brown silty clay
19 to 26 inches—pale brown silty clay loam
26 to 27 inches—white lime- and silica-cemented hardpan
27 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Contrasting Inclusions

Chayson, Howcree, Mug, and Oshone soils on lower lying terraces; very deep soils that are gravelly loam over gravelly clay and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Budlewis soil—depth to the clayey subsoil; Iwica soil—none
Dominant vegetation in natural potential plant community: Iwica soil—Idaho fescue, mountain big sagebrush; Budlewis soil—Idaho fescue, low sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth in the Budlewis soil.
• Plant rooting depth is limited to the upper part of the Budlewis soil because of the claypan.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Iwica soil—Loamy, 13 to 16 inch precipitation zone; Budlewis soil—Shallow claypan, 12 to 16 inch precipitation zone

56—Jestrick-Kecko complex, 1 to 8 percent slopes

Composition

Jestrick soil and similar inclusions—45 percent
Kecko soil and similar inclusions—40 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Jestrick Soil

Typical profile:
0 to 12 inches—brown loamy fine sand
12 to 31 inches—yellowish brown fine sandy loam
31 to 35 inches—pale brown cobbly loam
35 to 39 inches—white lime- and silica-cemented hardpan
39 inches—fractured bedrock
Depth class: Moderately deep to a hardpan

Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 3 to 4 inches
Potential rooting depth: 21 to 38 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Characteristics of the Kecko Soil

Typical profile:
0 to 6 inches—light brownish gray fine sandy loam
6 to 20 inches—pale brown fine sandy loam
20 to 29 inches—light gray fine sandy loam
29 to 42 inches—light gray sandy loam
42 to 70 inches—very pale brown loamy fine sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 7 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Barrymore, Emberton, Harsan, Quincy, Starbuck, and Taunton soils on terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this unit.
• Production of irrigated crops is limited by the severe hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, planting field windbreaks, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated

57—Kavon very gravelly loam, 5 to 35 percent slopes

Composition

Kavon soil and similar inclusions—75 percent
Contrasting inclusions—25 percent

Setting

Position on landscape: Hill slopes
Elevation: 6,800 to 7,700 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 38 to 41 degrees F
Frost-free season: 20 to 50 days

Characteristics of the Kavon Soil

Typical profile:
0 to 4 inches—brown very gravelly loam
4 to 12 inches—dark grayish brown very gravelly loam
12 to 39 inches—brown very gravelly loam
39 to 62 inches—light yellowish brown extremely gravelly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Very severe
Shrink-swell potential: Moderate
Acidity throughout the profile: Very strongly acid or extremely acid

Contrasting Inclusions

Dehana soils on breaks and hill slopes, Keman soils on summits, very deep soils that are gravelly loam over gravelly sandy loam and are on hill slopes, areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Acidity, base saturation, short growing season, hazard of water erosion
Dominant vegetation in natural potential plant community: Snowbrush ceanothus
General management considerations:
• Forage production is limited by the short growing season, acidity, and low base saturation.

• Seeding is limited by the severe hazard of water erosion.
• Plants that can tolerate the acidity of the soil should be seeded.
• These soils are hydrophobic because of the waxy resin excreted from the snowbrush ceanothus.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Ceanothus thicket, 16 to 24 inch precipitation zone

58—Kecko fine sandy loam, 1 to 4 percent slopes

Composition

Kecko soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 2,900 to 4,400 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Kecko Soil

Typical profile:
0 to 6 inches—light brownish gray fine sandy loam
6 to 13 inches—pale brown fine sandy loam
13 to 23 inches—light brownish gray fine sandy loam
23 to 33 inches—light gray fine sandy loam
33 to 54 inches—light gray loamy fine sand
54 to 67 inches—white sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 6 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Rad, Shano, and Sluka soils on higher lying terraces; Harsan, Paulville, Ouincy, and Sidlake soils on terraces; Tulch soils on stream terraces; soils that are moderately deep to sand and gravel, are sandy loam, and are on lower lying terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

59—Kecko fine sandy loam, 4 to 8 percent slopes

Composition

Kecko soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 2,900 to 4,400 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Kecko Soil

Typical profile:
0 to 5 inches—light brownish gray fine sandy loam
5 to 23 inches—light brownish gray fine sandy loam
23 to 35 inches—pale brown loamy fine sand
35 to 47 inches—very pale brown loamy fine sand
47 to 55 inches—very pale brown loamy sand
55 to 72 inches—black and white sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 6 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Shano, and Taunton soils on higher lying terraces; Quincy soils on terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by the low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Regulating irrigation water helps to control runoff and erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

60—Kecko-Emberton complex, 1 to 6 percent slopes

Composition

Kecko soil and similar inclusions—55 percent
Emberton soil and similar inclusions—30 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Kecko soil—concave areas of terraces, Emberton soil—plane to convex areas of terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 50 to 52 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Kecko Soil

Typical profile:
0 to 7 inches—brown loamy fine sand
7 to 25 inches—yellowish brown fine sandy loam
25 to 38 inches—very pale brown fine sandy loam
38 to 48 inches—very pale brown sandy loam
48 to 74 inches—pale brown fine sand
Depth class: Very deep
Drainage class: Well drained

Permeability: Moderately rapid
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Characteristics of the Emberton Soil

Typical profile:
0 to 32 inches—yellowish brown loamy fine sand
32 to 39 inches—pale brown fine sandy loam
39 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Available water capacity: 2 to 4 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Bahem, Banbury, and Trevino soils on higher lying terraces; Harsan, Suepert, Quincy, and Taunton soils in plane to convex areas of terraces; soils that are shallow to bedrock, are loamy fine sand, and are on terraces; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of wind erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

61—Keman very gravelly loam, 2 to 35 percent slopes

Composition

Keman soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Summits
Elevation: 6,800 to 7,700 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 38 to 41 degrees F
Frost-free season: 20 to 50 days

Characteristics of the Keman Soil

Typical profile:
0 to 5 inches—very dark gray very gravelly loam
5 to 33 inches—very dark grayish brown and dark grayish brown very gravelly loam
33 to 60 inches—light brownish gray extremely gravelly clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4.5 to 6.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Dehana soils on hill slopes and breaks; Kavon soils on hill slopes; Rutherford soils on ridges; soils that are moderately deep to bedrock, are very gravelly loam over extremely gravelly clay loam, and are on summits; soils that are very deep, are very gravelly loam over very gravelly clay, and are on summits

Use and Management

Major use: Rangeland
Major management factors: Growing season, hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management considerations:
• Forage production is limited by the short growing season.

• Because cold soil temperatures limit plant growth, grazing should be delayed until the soil has warmed up and the forage plants have achieved sufficient growth.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 16+ inch precipitation zone

62—Kudlac silty clay, 4 to 30 percent slopes

Composition

Kudlac soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces and breaks
Elevation: 2,800 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Kudlac Soil

Typical profile:
0 to 4 inches—light gray silty clay
4 to 7 inches—light gray clay
7 to 11 inches—pale brown loam
11 to 14 inches—brown sandy loam
14 to 27 inches—brown silty clay loam
27 to 30 inches—white silty clay loam
30 to 43 inches—brown silty clay loam
43 to 60 inches—grayish brown silty clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate
Shrink-swell potential: High
Salinity throughout profile: Low or moderate

Contrasting Inclusions

Antelope Springs soils on lower lying terraces; Blacknest and Purdam soils on the sides of terraces; Fathom soils on terraces and breaks; very deep, poorly drained soils that are silty clay over silty clay loam and are in depressional areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, the severe hazard of water erosion, and the moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

63—Lankbush loamy sand, 2 to 10 percent slopes

Composition

Lankbush soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces and foot slopes
Elevation: 3,000 to 5,500 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free season: 100 to 140 days

Characteristics of the Lankbush Soil

Typical profile:
0 to 6 inches—brown loamy sand
6 to 20 inches—brown sandy clay loam
20 to 38 inches—light yellowish brown sandy loam
38 to 46 inches—light yellowish brown loamy sand
46 to 60 inches—very pale brown loamy sand
60 to 65 inches—very pale brown sandy loam
Depth class: Very deep

Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.0 to 6.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe
Shrink-swell potential: Moderate

Contrasting Inclusions

Arbidge soils on lower lying terraces; Banbury and Chuska soils on dip slopes and higher lying terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, slope, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.
• Seeding generally is most successful late in fall, however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by slope.
• Regulating irrigation water helps to control runoff and erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

64—Lud silt loam, 2 to 10 percent slopes

Composition

Lud soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 4,500 to 5,300 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Lud Soil

Typical profile:
0 to 2 inches—pale brown silt loam
2 to 11 inches—pale brown silty clay loam
11 to 16 inches—very pale brown gravelly loam
16 to 26 inches—white fractured lime- and silica-cemented hardpan
26 inches—fractured bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Chuska, Owsel, Power, Roseworth, and Shano soils on lower lying terraces; soils that are deep to a hardpan, are silt loam over silty clay loam, and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth

to the hardpan, available water capacity, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy, 10 to 13 inch precipitation zone

65—Lud very cobbly silt loam, 2 to 10 percent slopes

Composition

Lud soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 4,500 to 5,300 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Lud Soil

Typical profile:
0 to 3 inches—pale brown very cobbly silt loam
3 to 9 inches—pale brown cobbly silty clay loam
9 to 15 inches—very pale brown cobbly silty clay
15 to 21 inches—white fractured lime- and silica-cemented hardpan
21 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Chuska, Elijah, Owsel, and Roseworth soils on lower lying terraces; soils that are moderately deep to a hardpan, are silt loam over silty clay loam, and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation, the rock fragments in the surface layer, and the moderate hazard of water erosion.
• The use of equipment is limited by the rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Loamy, 10 to 13 inch precipitation zone

66—Mackey very gravelly loam, 8 to 30 percent slopes

Composition

Mackey soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Dip slopes
Elevation: 4,300 to 5,500 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Mackey Soil

Typical profile:
0 to 3 inches—pale brown very gravelly loam
3 to 10 inches—pale brown very gravelly clay loam
10 to 16 inches—very pale brown extremely gravelly loam
16 to 36 inches—very pale brown extremely gravelly sandy loam
36 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 3 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Chuska, Lankbush, Owsel, and Schnipper soils on lower lying terraces; Flatron and Ragpie soils on ridges; soils that are shallow to bedrock, are very gravelly loam over extremely gravelly loam, and are on dip slopes; areas of Rock outcrop; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Precipitation, available water capacity, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, antelope bitterbrush
General management considerations:
• Forage production is limited by low precipitation and low available water capacity.
• Seeding is limited by low precipitation, rock fragments in the surface layer, and the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Gravelly loam, 10 to 13 inch precipitation zone

67—Minidoka silt loam, 0 to 2 percent slopes

Composition

Minidoka soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Minidoka Soil

Typical profile:
0 to 11 inches—light brownish gray silt loam
11 to 17 inches—light gray silt loam
17 to 23 inches—very pale brown silt loam
23 to 40 inches—white lime- and silica-cemented hardpan
40 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 8.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Chiara and Minveno soils on higher lying terraces; Portneuf soils on lower lying terraces

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.

• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIs, irrigated, and VIs, nonirrigated

68—Minidoka silt loam, 2 to 4 percent slopes

Composition

Minidoka soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Minidoka Soil

Typical profile:
0 to 6 inches—pale brown silt loam
6 to 13 inches—pale brown silt loam
13 to 26 inches—light gray silt loam
26 to 40 inches—white lime- and silica-cemented hardpan
40 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 8.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Portneuf, and Sluka soils on lower lying terraces; Minveno soils on higher lying terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIs, nonirrigated

69—Minveno silt loam, 0 to 2 percent slopes

Composition

Minveno soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Minidoka Soil

Typical profile:
0 to 8 inches—light brownish gray silt loam
8 to 18 inches—white silt loam
18 to 23 inches—white lime- and silica-cemented hardpan
23 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Portneuf and Sluka soils on lower lying terraces

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

70—Minveno silt loam, 2 to 8 percent slopes

Composition

Minveno soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Minveno Soil

Typical profile:
0 to 8 inches—pale brown silt loam
8 to 15 inches—very pale brown silt loam
15 to 30 inches—white lime- and silica-cemented hardpan
30 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Chuska, Dolman, and Minidoka soils on terraces; Portneuf and Sluka soils on lower lying terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, slope, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but

surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, slope, and the moderate hazards of wind and water erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

71—Minveno very stony silt loam, 2 to 20 percent slopes

Composition

Minveno soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Minveno Soil

Typical profile:
0 to 2 inches—pale brown very stony silt loam
2 to 12 inches—pale brown silt loam
12 to 18 inches—light gray silt loam
18 to 26 inches—white lime- and silica-cemented hardpan
26 inches—bedrock
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1.5 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Minidoka and Trevino soils on lower lying terraces; soils that are very shallow to a hardpan, are silt loam, and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, rock fragments in the surface layer, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation, rock fragments in the surface layer, and the moderate hazards of water and wind erosion.
• The use of equipment is limited by the rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

72—Mug very cobbly loam, 2 to 10 percent slopes

Composition

Mug soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 5,600 to 6,300 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Mug Soil

Typical profile:
0 to 5 inches—grayish brown very cobbly loam
5 to 14 inches—grayish brown extremely gravelly clay loam

14 to 25 inches—brown gravelly clay
25 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 20 to 30 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Budlewis, Howcree, and Tanner soils on lower lying terraces; Eep soils on hill slopes; Isknat soils on fan terraces; soils that are moderately deep to bedrock, are cobbly loam over gravelly clay loam over gravelly clay, and are on terraces; soils that are shallow to bedrock, are very cobbly loam over extremely gravelly clay loam over gravelly clay, and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the clayey subsoil, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, low sagebrush
General management considerations:
• Forage production is limited by low precipitation and shallow rooting depth.
• Plant rooting depth is limited to the upper part of the soil because of the claypan.
• Seeding is limited by low precipitation, rock fragments in the surface layer, and the moderate hazard of water erosion.
• The use of equipment is limited by the rock fragments in the surface layer.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Shallow claypan, 12 to 16 inch precipitation zone

73—Oshone clay loam, 2 to 8 percent slopes

Composition

Oshone soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,500 to 6,100 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 90 to 105 days

Characteristics of the Oshone Soil

Typical profile:
0 to 5 inches—grayish brown clay loam
5 to 16 inches—brown clay
16 to 22 inches—dark yellowish brown very gravelly clay
22 to 31 inches—very pale brown lime- and silica-cemented hardpan
31 to 60 inches—variegated very gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 4.0 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Amboat and Brose soils on summits; Chayson soils on terraces; Congle soils on foot slopes; Doodlelink soils on breaks; Ruclick soils on dip slopes; Tucker soils on flood plains; very deep, poorly drained soils that are clay loam over clay over very gravelly clay and are in depressional areas of terraces; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, mountain big sagebrush
General management considerations:
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Loamy, 13 to 16 inch precipitation zone

74—Oshone complex, 2 to 10 percent slopes

Composition

Oshone soil and similar inclusions—45 percent
Oshone soil, eroded, and similar inclusions—40 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,600 to 6,100 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 90 to 105 days

Characteristics of the Oshone Soil

Typical profile:
0 to 6 inches—grayish brown and brown clay loam
6 to 16 inches—brown clay
16 to 27 inches—brown gravelly clay
27 to 38 inches—light brown very gravelly clay loam
38 to 47 inches—very pale brown lime- and silica-cemented hardpan
47 to 60 inches—weakly cemented very gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 3 to 5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Oshone Soil, Eroded

Typical profile:
0 to 5 inches—brown clay loam
5 to 12 inches—brown gravelly clay
12 to 20 inches—dark yellowish brown clay
20 to 24 inches—very pale brown very gravelly clay
24 to 34 inches—very pale brown lime- and silica-cemented hardpan
34 to 70 inches—variegated very gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 3 to 5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Aninto, Chayson, and Tanner soils in lower lying areas of terraces; very deep, poorly drained soils that are clay loam over clay over very gravelly clay and are in depressional areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Depth to the clayey subsoil in the Oshone soil, eroded; hazard of water erosion
Dominant vegetation in natural potential plant community: Oshone soil—Idaho fescue, mountain big sagebrush; Oshone soil, eroded—Idaho fescue, low sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth of the eroded Oshone soil.
• Plant rooting depth is limited to the upper part of the eroded Oshone soil because of the claypan.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: IVs, nonirrigated
Range site: Oshone soil—Loamy, 13 to 16 inch precipitation zone; Oshone soil, eroded—Shallow claypan, 12 to 16 inch precipitation zone

75—Owsel silt loam, 0 to 2 percent slopes

Composition

Owsel soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 5,100 to 5,200 feet
Average annual precipitation: 10 to 12 inches

Average annual air temperature: 47 to 48 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Owsel Soil

Typical profile:
0 to 9 inches—brown silt loam
9 to 18 inches—pale brown silty clay loam
18 to 26 inches—pale brown silt loam
26 to 52 inches—light gray silt loam
52 to 68 inches—pale brown very fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Lud soils on terraces, very deep soils that are silt loam over silty clay over silt loam and are on terraces

Use and Management

Major use: Rangeland
Major management factor: Precipitation
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIc, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

76—Owsel silt loam, 2 to 4 percent slopes

Composition

Owsel soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Owsel Soil

Typical profile:
0 to 4 inches—light brownish gray silt loam
4 to 18 inches—pale brown silt loam
18 to 28 inches—pale brown silty clay loam
28 to 42 inches—very pale brown silt loam
42 to 60 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem, Purdam, and Rad soils on lower lying terraces; very deep soils that are silt loam over silty clay over silt loam and are on terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, weak cementation

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are

suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 15 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth of the soil.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

77—Owsel silt loam, 4 to 8 percent slopes

Composition

Owsel soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Owsel Soil

Typical profile:
0 to 9 inches—pale brown silt loam
9 to 18 inches—pale brown silty clay loam
18 to 26 inches—pale brown silt loam
26 to 52 inches—very pale brown loam
52 to 68 inches—very pale brown sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Kecko, Portneuf, and Sluka soils on lower lying terraces; Purdam and Rad soils on the sides of terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, weak cementation, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 15 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth of the soil.
• Production of irrigated crops is limited by slope.
• Regulating the application of irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

78—Owsel silt loam, 8 to 12 percent slopes

Composition

Owsel soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Owsel Soil

Typical profile:
0 to 9 inches—pale brown silt loam
9 to 18 inches—pale brown silty clay loam
18 to 26 inches—pale brown silt loam
26 to 52 inches—very pale brown loam
52 to 68 inches—very pale brown sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Purdam soils on the sides of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

79—Owsel silt loam, 12 to 20 percent slopes

Composition

Owsel soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Owsel Soil

Typical profile:
0 to 8 inches—brown silt loam
8 to 39 inches—pale brown silt loam
39 to 65 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 8.5 to 10.0 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Purdam soils on the sides of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

80—Paniogue loam, 0 to 2 percent slopes

Composition

Paniogue soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 2,800 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Paniogue Soil

Typical profile:
0 to 7 inches—pale brown loam
7 to 11 inches—light brownish gray loam
11 to 16 inches—brown loam
16 to 22 inches—light brownish gray gravelly sandy loam
22 to 60 inches—variegated sand and gravel
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5.0 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Owsel soils on lower lying terraces; Taunton and Scoon soils on higher lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush

General management considerations:
- Forage production is limited by low precipitation.
- Seeding is limited by low precipitation and moderate hazard of wind erosion.
- Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
- Most climatically suited crops can be grown if irrigation water is provided.
- Surface and sprinkler irrigation systems are suited to this soil.
- Production of irrigated crops is limited by the moderate hazard of wind erosion.
- The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

81—Paniogue loam, 2 to 4 percent slopes

Composition

Portneuf soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 2,800 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Paniogue Soil

Typical profile:
0 to 5 inches—yellowish brown loam
5 to 25 inches—light yellowish brown very fine sandy loam
25 to 35 inches—very pale brown sandy loam

35 to 60 inches—multicolored very gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 5.0 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Banbury soils on higher lying terraces

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated

82—Paulville silt loam, 0 to 2 percent slopes

Composition

Paulville soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 5,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Paulville Soil

Typical profile:
0 to 8 inches—brown silt loam
8 to 22 inches—pale brown clay loam
22 to 28 inches—pale brown loam
28 to 60 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9.0 to 10.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Arbidge soils on terraces, Chuska soils on higher lying terraces, Tulch soils on stream terraces

Use and Management

Major use: Rangeland
Major management factor: Precipitation
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIc, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

83—Paulville-Idow complex, 1 to 4 percent slopes

Composition

Paulville soil and similar inclusions—50 percent
Idow soil and similar inclusions—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Paulville Soil

Typical profile:
0 to 8 inches—brown loam
8 to 31 inches—yellowish brown loam
31 to 40 inches—very pale brown loam
40 to 47 inches—light yellowish brown loam
47 to 60 inches—pale brown gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9.0 to 10.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Characteristics of the Idow Soil

Typical profile:
0 to 23 inches—yellowish brown loam
23 to 39 inches—very pale brown silt loam
39 to 60 inches—very pale brown fractured lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 5 to 8 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem, Rad, and Shano soils on lower lying terraces; Barrymore, Sluka, Starbuck, and Taunton soils on higher lying terraces; Elijah, Emberton, Harsan, Kecko, and Sidlake soils on terraces; Tulch soils on stream terraces; soils that are moderately deep to a hardpan, are loam over heavy clay loam over loam, and are on terraces; soils that are moderately deep to a hardpan, are silt loam over silty clay loam over silt loam, and are on terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factor: Permeability
General management considerations:
• Most climatically adapted crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIs, nonirrigated

84—Pits, gravel

Description of areas: Small to large open excavations 2 to 20 feet deep or more where gravel, cinders, soil material, or bedrock was removed for construction purposes
Location in survey area: Areas ranging from 2,900 feet in elevation along the Snake River to 6,000 feet in the Shoshone Basin
Vegetation: Little, if any
Land capability classification: VIII

85—Player-Rock outcrop complex, 30 to 75 percent slopes

Composition

Player soil and similar inclusions—30 percent
Player soil, thick surface, and similar inclusions—25 percent
Rock outcrop—30 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Player soil—convex areas of breaks, Player soil, thick surface—concave areas of breaks (see fig. 7 next page)

Figure 7.—Area of Player-Rock outcrop complex, 30 to 75 percent slopes, on breaks.

Elevation: 5,400 to 6,400 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free season: 70 to 80 days

Characteristics of the Player Soil

Slope range: 30 to 75 percent
Typical profile:
0 to 5 inches—dark grayish brown very gravelly loam
5 to 11 inches—dark grayish brown very gravelly clay
11 to 22 inches—brown extremely gravelly clay
22 to 45 inches—light yellowish brown extremely gravelly clay
45 to 60 inches—light brown extremely gravelly clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 4 to 6 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Very severe
Shrink-swell potential: High

Characteristics of the Player Soil, Thick Surface

Slope range: 30 to 50 percent
Typical profile:
0 to 9 inches—dark grayish brown very cobbly loam
9 to 17 inches—grayish brown very gravelly clay
17 to 60 inches—light brown extremely gravelly clay
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 5 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Very severe
Shrink-swell potential: High

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Sharp, angular cliffs and rimrock that border lower lying valley terraces and large, angular fragments randomly deposited downslope

Contrasting Inclusions

Dehana and Doodlelink soils on breaks; Elhina soils on lower lying terraces; Hogmalat and Keman soils on summits; Isknat soils on fan terraces; very deep soils that are gravelly loam over gravelly clay and are on breaks

Use and Management

Major use: Rangeland
Major management factors: Depth to the clayey subsoil, slope, hazard of water erosion, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Player soil—Idaho fescue, low sagebrush; Player soil, thick surface—bluebunch wheatgrass, mountain big sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth of the Player soil.
• The use of forage is limited by slope and the areas of Rock outcrop.

• Seeding is limited by the shallow depth to the clayey subsoil in the Player soil, slope, the areas of Rock outcrop, and the very severe hazard of water erosion.
• The use of equipment is limited by slope and the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Player soil—Shallow claypan, 12 to 16 inch precipitation zone; Player soil, thick surface—North slope stony, 12 to 16 inch precipitation zone

86—Portneuf silt loam, 0 to 2 percent slopes

Composition

Portneuf soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Portneuf Soil

Typical profile:
0 to 11 inches—light brownish gray silt loam
11 to 34 inches—very pale brown silt loam
34 to 60 inches—light yellowish brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem and Sluka soils on terreaces; Power and Rad soils on lower lying terraces; soils that are deep to a hardpan, are silt loam, and are on lower lying terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factors: Permeability, weak cementation, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 12 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the soil rough.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated

87—Portneuf silt loam, 2 to 4 percent slopes

Composition

Portneuf soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Portneuf Soil

Typical profile:
0 to 5 inches—light brownish gray silt loam
5 to 15 inches—pale brown silt loam
15 to 40 inches—very pale brown silt loam
40 to 60 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow

Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Minidoka, and Sluka soils on terraces; Rad soils on lower lying terraces; soils that are deep to a hardpan, are silt loam, and are on lower lying terraces; soils that are deep to bedrock, are silt loam, and are on higher lying terraces; areas of Rock outcrop

Use and Management

Major use: Irrigated cropland (fig. 8)

Figure 8.—Area of Portneuf silt loam, 2 to 4 percent slopes, used for pinto beans.

Major management factors: Permeability, weak cementation, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 12 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated

88—Portneuf silt loam, 4 to 8 percent slopes

Composition

Portneuf soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Portneuf Soil

Typical profile:
0 to 5 inches—light brownish gray silt loam
5 to 15 inches—pale brown silt loam
15 to 30 inches—light gray silt loam
30 to 60 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem and Sluka soils on the sides of terraces, areas of Rock outcrop

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Permeability, weak cementation, precipitation, slope, hazard of water erosion, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.

• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 12 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.
• Production of irrigated crops is limited by slope and the moderate hazards of water and wind erosion.
• Regulating irrigation water helps to control runoff and erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

89—Portneuf silt loam, 8 to 12 percent slopes

Composition

Portneuf soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Portneuf Soil

Typical profile:
0 to 7 inches—light brownish gray silt loam
7 to 13 inches—pale brown silt loam
13 to 46 inches—light gray silt loam
46 to 70 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem and Sluka soils on the sides of terraces

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Permeability, weak cementation, precipitation, slope, hazard of water erosion, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Because areas of this soil are long and narrow, management is dependent on the major uses of the adjacent areas that are less sloping and wider.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated

Range site: Loamy, 8 to 10 inch precipitation zone

90—Power silt loam, 1 to 4 percent slopes

Composition

Power soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Power Soil

Typical profile:
0 to 8 inches—brown silt loam
8 to 18 inches—pale brown silty clay loam
18 to 60 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 11.0 to 12.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem, Hoosegow, and Kecko soils on terraces; Banbury, Barrymore, Dolman, Elijah, and McCain soils on higher lying terraces; Owinza soils in depressional areas of terraces; Tulch soils on stream terraces

Use and Management

Major use: Irrigated cropland
Major management factor: Permeability
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated

91—Power-McCain complex, 1 to 6 percent slopes

Composition

Power soil and similar inclusions—50 percent
McCain soil and similar inclusions—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Power soil—concave areas of terraces, McCain soil—convex areas of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Power Soil

Typical profile:
0 to 6 inches—brown silt loam
6 to 14 inches—brown silt loam
14 to 28 inches—yellowish brown silty clay loam
28 to 58 inches—very pale brown silt loam
58 to 72 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 11 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Characteristics of the McCain Soil

Typical profile:
0 to 6 inches—brown silt loam
6 to 16 inches—yellowish brown silt loam
16 to 23 inches—very pale brown silt loam
23 inches—fractured bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches

Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Barrymore and Starbuck soils in convex areas of terraces; Hoosegow and Kecko soils on lower lying terraces; Owinza soils in depressional areas of terraces; soils that are shallow to bedrock, are silt loam, and are in convex areas of terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability

Rangeland

Dominant vegetation on natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

92—Power-Owinza-Rock outcrop complex, 1 to 8 percent slopes

Composition

Power soil and similar inclusions—45 percent
Owinza soil and similar inclusions—35 percent
Rock outcrop—10 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Power soil—plane to convex areas of terraces, Owinza soil—concave areas of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Power Soil

Slope range: 1 to 8 percent
Typical profile:
0 to 8 inches—pale brown silt loam
8 to 20 inches—light yellowish brown silt loam
20 to 34 inches—white loam
34 to 60 inches—light yellowish brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Owinza Soil

Slope range: 1 to 3 percent
Typical profile:
0 to 4 inches—very pale brown silt loam
4 to 10 inches—yellowish brown clay
10 to 16 inches—very pale brown clay
16 to 23 inches—white silty clay loam
23 to 63 inches—very pale brown loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 6 to 8 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High
Salinity: Moderately saline between depths of 16 and 63 inches

Characteristics of the Rock Outcrop

Kind of rock: Exposed basalt

Description of areas: Sharp, angular to semirounded, long, narrow ridges ranging to semirounded outcroppings that extend 1 foot to 10 feet above the adjacent landscape

Contrasting Inclusions

Banbury, Barrymore, McCain, and Starbuck soils on higher lying terraces; Kecko, Purdam, and Shano soils on lower lying terraces; Tulch soils on stream terraces; soils that are shallow to bedrock, are very cobbly loam over very gravelly loam, and are on ridges; very deep, poorly drained soils that are silt loam over silty clay and are in basins; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, hazard of water erosion, areas of Rock outcrop

Rangeland

Dominant vegetation in natural potential plant community: Power soil—bluebunch wheatgrass, Wyoming big sagebrush; Owniza soil—bluebunch wheatgrass, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the areas of Rock outcrop.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• The use of equipment is limited by the areas of Rock outcrop.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to the Power soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability of the Power soil and the very slow permeability of the Owinza soil, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the moderate hazard of water erosion on the Power soil and the areas of Rock outcrop.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Power soil—Loamy, 8 to 12 inch precipitation zone; Owinza soil—Slick spot sodic, 8 to 12 inch precipitation zone

93—Purdam silt loam, 1 to 4 percent slopes

Composition

Purdam soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 5,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Purdam Soil

Typical profile:
0 to 4 inches—brown silt loam
4 to 8 inches—yellowish brown silt loam
8 to 15 inches—pale brown silty clay loam
15 to 26 inches—light gray silt loam
26 to 51 inches—white lime- and silica-cemented hardpan over very pale brown loam
51 to 66 inches—very pale brown very fine sandy loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.5 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Blacknest, Dolman, and Rakane soils on lower lying terraces; Power, Rad, Shano, and Sluka soils on higher lying terraces; soils that are

shallow to a hardpan, are silt loam over silty clay loam over silt loam, and are on higher lying terraces; areas of Rock outcrop

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, permeability

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

94—Purdam silt loam, 4 to 8 percent slopes

Composition

Purdam soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 5,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Purdam Soil

Typical profile:
0 to 4 inches—brown silt loam
4 to 7 inches—pale brown silt loam
7 to 14 inches—pale brown silty clay loam
14 to 20 inches—light yellowish brown silt loam
20 to 33 inches—very pale brown silt loam
33 to 70 inches—white lime- and silica-cemented hardpan over very pale brown silt loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.5 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Blacknest, Rakane, and Sluka soils on lower lying terraces; Elijah, Power, and Shano soils on higher lying terraces; areas of Rock outcrop

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.

• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by slope and the moderate hazard of water erosion.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

95—Purdam silt loam, 8 to 12 percent slopes

Composition

Purdam soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Purdam Soil

Typical profile:
0 to 3 inches—light brownish gray silt loam
3 to 10 inches—pale brown silt loam
10 to 16 inches—light brownish gray silt loam
16 to 32 inches—very pale brown silt loam
32 to 60 inches—white lime- and silica-cemented hardpan over light yellowish brown gravelly loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.5 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem soils on the sides of terraces; Power soils on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

96—Quincy loamy fine sand, 2 to 20 percent slopes

Composition

Quincy soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,000 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Quincy Soil

Typical profile:
0 to 5 inches—pale brown loamy fine sand
5 to 54 inches—pale brown loamy fine sand
54 to 70 inches—light gray stratified silt loam and fine sandy loam
Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Available water capacity: 6 to 7 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight

Hazard of wind erosion: Severe
Effervescence: Slight or strong in the surface layer

Contrasting Inclusions

Kudlac soils on the sides of terraces, Lankbush and Rad soils on lower lying terraces; areas of blowout

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of wind erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

97—Quincy-Kecko complex, 1 to 6 percent slopes

Composition

Quincy soil and similar inclusions—45 percent
Kecko soil and similar inclusions—40 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Quincy Soil

Typical profile:
0 to 10 inches—light brownish gray loamy fine sand
10 to 42 inches—light gray loamy fine sand
42 to 53 inches—very pale brown fine sandy loam
53 to 70 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Excessively drained
Permeability: Rapid
Available water capacity: 6.5 to 7.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Characteristics of the Kecko Soil

Typical profile:
0 to 10 inches—pale brown loamy fine sand
10 to 18 inches—pale brown fine sandy loam
18 to 60 inches—light brownish gray fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 7.5 to 8.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Severe

Contrasting Inclusions

Fathom, Jestrick, and Taunton soils on higher lying terraces; soils that are deep to bedrock, are loamy fine sand over fine sandy loam, and are on lower lying terraces; areas of Rock outcrop

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is suited to this soil.
• Production of irrigated crops is limited by the severe hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Rangeland

Dominant vegetation in natural potential plant community: Indian ricegrass, needleandthread, basin big sagebrush
General management considerations:
• Forage production is limited by low

precipitation.
• Seeding is limited by low precipitation and the severe hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.
• Seeding burned or disturbed areas helps to control blowing and drifting sand.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Sand, 8 to 12 inch precipitation zone

98—Rad silt loam, 0 to 2 percent slopes

Composition

Rad soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,200 to 4,500 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Rad Soil

Typical profile:
0 to 6 inches—pale brown silt loam
6 to 17 inches—pale brown and very pale brown silt loam
17 to 60 inches—very pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Bahem and Sluka soils on terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Permeability, weak cementation
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 15 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated

99—Rad silt loam, 2 to 4 percent slopes

Composition

Rad soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Rad Soil

Typical profile:
0 to 8 inches—brown silt loam
8 to 22 inches—pale brown silt loam
22 to 45 inches—light gray silt loam
45 to 60 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Bahem, Portneuf, and Shano soils on terraces, Power and Sluka soils on lower lying terraces, areas of Rock outcrop

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, permeability, weak cementation

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 15 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIe, irrigated, and VIc, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

100—Rad silt loam, 4 to 8 percent slopes

Composition

Rad soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Rad Soil

Typical profile:
0 to 4 inches—pale brown silt loam
4 to 9 inches—brown silt loam
9 to 13 inches—pale brown silt loam
13 to 23 inches—light gray silt loam
23 to 47 inches—pale brown very fine sandy loam
47 to 60 inches—very pale brown very fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Bahem and Portneuf soils on the sides of terraces; Barrymore soils on higher lying terraces; Sluka soils on lower lying terraces; areas of Rock outcrop

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, permeability, weak cementation, slope, hazard of water erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Roots are restricted below a depth of 15 to 30 inches because of the weak silica cementation.
• Deep chiseling or ripping improves the rooting depth.
• Production of irrigated crops is limited by slope and the moderate hazard of water erosion.

• Regulating irrigation water helps to control runoff and erosion.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

101—Rad silt loam, 8 to 12 percent slopes

Composition

Rad soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 4,100 to 4,300 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Rad Soil

Typical profile:
0 to 9 inches—brown silt loam
9 to 15 inches—pale brown silt loam
15 to 21 inches—light brownish gray silt loam
21 to 60 inches—light gray and light brownish gray silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Bahem soils on the sides of terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Permeability, weak cementation, slope, hazard of water erosion
General management considerations:
• Because areas of this soil are long and narrow, management is dependent on the major uses of the less sloping, wider surrounding areas.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated

102—Rad silt loam, 12 to 20 percent slopes

Composition

Rad soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 110 to 140 days

Characteristics of the Rad Soil

Typical profile:
0 to 28 inches—pale brown silt loam
28 to 44 inches—very pale brown silt loam
44 to 60 inches—light gray very fine sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 10 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Bahem soils on the sides of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

103—Ragpie-Flatron complex, 2 to 20 percent slopes

Composition

Ragpie soil and similar inclusions—60 percent
Flatron soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Ragpie soil—convex areas of ridges and dip slopes; Flatron soil—concave and plane areas of ridges and dip slopes
Elevation: 5,000 to 5,700 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Ragpie Soil

Typical profile:
0 to 3 inches—brown very gravelly loam
3 to 9 inches—brown gravelly clay loam
9 to 16 inches—pale brown very gravelly clay loam
16 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1.5 to 2.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Flatron Soil

Typical profile:
0 to 4 inches—grayish brown very gravelly loam
4 to 6 inches—brown very cobbly clay loam
6 to 12 inches—brown extremely gravelly clay
12 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Slow
Available water capacity: 1 inch to 2 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Mackey and Ruclick soils on dip slopes; soils that are shallow to bedrock, are gravelly loam over gravelly clay, and are on ridges; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Depth to bedrock, available water capacity, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass,Wyoming big sagebrush
General management considerations:
• Forage production is limited by the shallow rooting depth and low available water capacity.
• Seeding is limited by the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Shallow stony, 12 to 16 inch precipitation zone

104—Rakane-Blacknest complex, 1 to 4 percent slopes

Composition

Rakane soil and similar inclusions—45 percent
Blacknest soil and similar inclusions—35 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Rakane Soil

Typical profile:
0 to 3 inches—brown loam
3 to 9 inches—pale brown loam
9 to 25 inches—light yellowish brown clay loam
25 to 38 inches—very pale brown gravelly loam
38 to 73 inches—lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Characteristics of the Blacknest Soil

Typical profile:
0 to 5 inches—pale brown loam
5 to 13 inches—pale brown sandy clay loam
13 to 24 inches—pale brown gravelly sandy clay loam
24 to 30 inches—very pale brown gravelly sandy loam
30 to 60 inches—multicolored extremely gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Available water capacity: 5.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem and Sluka soils on lower lying terraces; Chuska soils on higher lying terraces; soils that are deep to sand and gravel, are loam over sandy clay loam over sandy loam, and are on terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Permeability, precipitation

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this unit.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: IIIs, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

105—Rakane-Blacknest complex, 4 to 8 percent slopes

Composition

Rakane soil and similar inclusions—45 percent
Blacknest soil and similar inclusions—35 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Rakane Soil

Typical profile:
0 to 6 inches—light brownish gray loam
6 to 16 inches—pale brown sandy clay loam
16 to 24 inches—pale brown clay loam
24 to 41 inches—lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Blacknest Soil

Typical profile:
0 to 13 inches—pale brown loam
13 to 24 inches—pale brown gravelly clay loam
24 to 31 inches—very pale brown gravelly sandy loam
31 to 60 inches—multicolored extremely gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Available water capacity: 5.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Chuska soils on higher lying terraces; Sluka soils on lower lying terraces; soils that are deep to sand and gravel, are loam over sandy clay loam over gravelly loam, and are on the sides of terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to the soils in this unit, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by slope and the moderate hazard of water erosion.
• Regulating irrigation water helps to control runoff and erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

106—Rakane-Blacknest complex, 8 to 15 percent slopes

Composition

Rakane soil and similar inclusions—40 percent
Blacknest soil and similar inclusions—35 percent
Contrasting inclusions—25 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Rakane Soil

Typical profile:
0 to 5 inches—light brownish gray loam
5 to 20 inches—pale brown loam
20 to 29 inches—pale brown sandy clay loam
29 to 39 inches—very pale brown loam
39 to 62 inches—lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Blacknest Soil

Typical profile:
0 to 5 inches—light brownish gray loam
5 to 20 inches—pale brown sandy clay loam
20 to 30 inches—very pale brown gravelly sandy loam
30 to 60 inches—multicolored extremely gravelly sand
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Available water capacity: 5.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Very deep gravelly silt loam on the sides of terraces; soils that are deep to sand and gravel, are loam over sandy clay loam over gravelly sandy loam, and are on the sides of terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability, slope, hazard of water erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
- Forage production is limited by low precipitation.
- Seeding is limited by low precipitation and the moderate hazard of water erosion.
- Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management consideration:
- Because areas of this unit are long and narrow, management is dependent on the major uses of the adjacent areas that are less sloping and wider.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

107—Rock outcrop-Banbury-Paulville complex, 2 to 6 percent slopes

Composition

Rock outcrop—40 percent
Banbury soil and similar inclusions—30 percent
Paulville soil and similar inclusions—15 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Banbury soil—plane to convex areas of terraces, Paulville soil—concave areas of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Rock Outcrop

Kind of rock: Exposed basalt
Description of areas: Sharp, angular to semirounded, long, narrow ridges ranging to semirounded outcroppings that extend 1 foot to 10 feet above the adjacent landscape

Characteristics of the Banbury Soil

Typical profile:
0 to 5 inches—brown loam

5 to 9 inches—pale brown loam
9 to 15 inches—pale brown clay loam
15 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.0 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Characteristics of the Paulville Soil

Typical profile:
0 to 8 inches—pale brown loam
8 to 47 inches—pale brown clay loam
47 to 60 inches—light gray gravelly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 9 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Emberton, Kecko, and Quincy soils on lower lying terraces; McCain, Sidlake, and Suepert soils in plane to convex areas of terraces; Owinza soils in depressional areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, available water capacity, depth to bedrock, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Banbury and Paulville soils—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by the low precipitation and shallow rooting depth of the Banbury and Paulville soils and by the low available water capacity of the Banbury soil.
• Seeding is limited by low precipitation and the areas of Rock outcrop.
• The use of equipment is limited by the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Banbury soil—Shallow loamy, 8 to 12 inch precipitation zone; Paulville soil—Loamy, 8 to 12 inch precipitation zone

108—Rock outcrop-Xerorthents complex, very steep

Composition

Rock outcrop—50 percent
Xerorthents and similar inclusions—40 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Breaks
Elevation: 2,800 to 6,000 feet
Average annual precipitation: 8 to 15 inches
Average annual air temperature: 44 to 52 degrees F
Frost-free season: 90 to 140 days

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff or basalt
Description of areas: Very steep to perpendicular cliffs and rimrock that border lower lying valley terraces and talus material that separated from the rimrock and was randomly deposited downslope

Characteristics of the Xerorthents

Slope range: 40 to 75 percent
Example profile:
0 to 6 inches—pale brown stony loam
6 to 60 inches—very pale brown loam
Depth class: Shallow to very deep
Drainage class: Well drained or somewhat excessively drained
Permeability: Moderately slow to moderately rapid
Available water capacity: 7 to 11 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe

Contrasting Inclusions

Antelope Springs soils on alluvial fans; Gosinta soils on alluvial terraces; Kudlac soils on breaks; very deep very stony loam on

breaks; very deep, poorly drained soils that are silt loam over silty clay loam and are in depressional areas of alluvial terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, slope, hazard of water erosion, areas of Rock outcrop
Dominant vegetation in natural potential plant community: Xerorthents—bluebunch wheatgrass, Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• The use of forage by livestock is limited by slope.
• Seeding is limited by the severe hazard of water erosion, slope, and the areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIII, nonirrigated
Range site: Because of the variability of the Xerorthents, onsite evaluation is needed to determine the range site in specific areas.

109—Roseworth silt loam, 1 to 8 percent slopes

Composition

Roseworth soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 4,000 to 4,600 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Roseworth Soil

Typical profile:
0 to 3 inches—pale brown silt loam
3 to 8 inches—pale brown silty clay loam
8 to 15 inches—very pale brown silt loam
15 to 18 inches—white lime- and silica-cemented hardpan
18 to 27 inches—light yellowish brown sandy loam
27 to 45 inches—white fractured lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 4 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Chuska and Colthorp soils on higher lying terraces; Elijah soils on terraces; Shabliss and Yahoo soils on lower lying terraces; soils that are deep to a hardpan, are silt loam over silty clay loam over silt loam, and are on lower lying terraces; soils that are shallow to a hardpan, are slightly saline, and are on lower lying terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, available water capacity, depth to the hardpan, permeability, hazard of water erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of water erosion.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:

• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

110—Roseworth cobbly silt loam, 1 to 8 percent slopes

Composition

Roseworth soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 4,000 to 4,600 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 100 to 120 days

Characteristics of the Roseworth Soil

Typical profile:
0 to 3 inches—pale brown cobbly silt loam
3 to 8 inches—pale brown silty clay loam
8 to 15 inches—very pale brown gravelly loam
15 to 18 inches—white lime- and silica-cemented hardpan
18 to 27 inches—very pale brown gravelly fine sandy loam
27 inches—fractured white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2 to 4 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Elijah soils on mounds

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of water erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

111—Roza loam, 0 to 1 percent slopes

Composition

Roza soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Playas
Elevation: 4,500 to 4,600 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 50 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Roza Soil

Typical profile:
0 to 1 inch—light gray loam
1 inch to 4 inches—light gray clay loam
4 to 18 inches—light brownish gray clay

18 to 30 inches—pale brown clay
30 to 49 inches—pale brown clay loam
49 to 73 inches—very pale brown clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Available water capacity: 8 to 10 inches
Potential rooting depth: 60 inches or more
Runoff: Ponded
Hazard of water erosion: Slight
Shrink-swell potential: High

Contrasting Inclusions

Very deep soils that are cobbly loam over clay loam over loam and are on playas

Use and Management

Major use: Rangeland
Major management factors: Precipitation
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

112—Ruclick very gravelly loam, 5 to 30 percent slopes

Composition

Ruclick soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Dip slopes
Elevation: 5,100 to 6,000 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Ruclick Soil

Typical profile:
0 to 3 inches—grayish brown very gravelly loam
3 to 9 inches—brown gravelly clay loam
9 to 28 inches—brown extremely gravelly clay loam
28 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2.5 to 4.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Chuska and Oshone soils on lower lying terraces; Flatron and Ragpie soils on ridges; Nawt soils on breaks; soils that are moderately deep to bedrock, are very gravelly loam over gravelly loam, amd are on dip slopes; areas of Rock outcrop; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, the rock fragments in the surface layer, and the moderate hazard of water erosion
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Stony loam, 12 to 16 inch precipitation zone

113—Rutherford extremely gravelly loam, 2 to 20 percent slopes

Composition

Rutherford soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Ridges and dip slopes
Elevation: 6,500 to 7,700 feet
Average annual precipitation: 15 to 20 inches
Average annual air temperature: 37 to 43 degrees F
Frost-free season: 20 to 60 days

Characteristics of the Rutherford Soil

Typical profile:
0 to 4 inches—grayish brown extremely gravelly loam
4 to 10 inches—brown very gravelly clay loam
10 to 19 inches—yellowish brown very gravelly clay loam
19 to 26 inches—brown extremely gravelly clay loam
26 inches—bedrock
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Slow
Available water capacity: 1.5 to 3.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Hogmalat and Keman soils on summits; soils that are shallow to bedrock, are very gravelly clay, and are on ridges; soils that are deep to bedrock, are gravelly loam over gravelly clay loam, and are on ridges; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Growing season, available water capacity, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Idaho fescue, low sagebrush
General management considerations:
- Forage production is limited by the short growing season and low available water capacity.
- Seeding is limited by the rock fragments in the surface layer and the moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Mountain ridge, 14 to 18 inch precipitation zone

114—Schnipper silt loam, 2 to 6 percent slopes

Composition

Schnipper soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 10 to 14 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Schnipper Soil

Typical profile:
0 to 4 inches—grayish brown silt loam
4 to 8 inches—brown silt loam
8 to 30 inches—brown and pale brown clay loam
30 to 37 inches—very pale brown loam
37 to 40 inches—white hardpan over very pale brown gravelly loam
40 to 60 inches—yellowish brown gravelly clay loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Chuska soils on ridges; Rogerson soils on terraces; soils that are deep to a hardpan,

are silt loam over clay loam over loam, and are on terraces

Use and Management

Major use: Nonirrigated cropland
Major management factor: Precipitation
General management considerations:
• Continuous cropping is not suited to this soil because of the limited precipitation and lack of irrigation water.
• A suitable cropping system includes small grain and summer fallow.

Interpretive Groups

Land capability classification: IVs, nonirrigated

115—Schnipper silt loam, 6 to 12 percent slopes

Composition

Schnipper soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 10 to 14 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Schnipper Soil

Typical profile:
0 to 11 inches—brown silt loam
11 to 22 inches—brown silty clay loam
22 to 36 inches—pale brown loam
36 to 39 inches—white lime- and silica-cemented hardpan over very pale brown gravelly loam
39 to 60 inches—light yellowish brown gravelly clay loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Chuska soils on ridges; Rogerson soils on terraces; soils that are deep to a hardpan, are silt loam over silty clay loam over loam, and are on terraces

Use and Management

Major use: Nonirrigated cropland
Major management factors: Precipitation, slope, hazard of water erosion
General management considerations:
• Continuous cropping is not suited to this soil because of the limited precipitation and lack of irrigation water.
• A suitable cropping system includes small grain and summer fallow.
• Production of crops is limited by slope.
• Farming on the contour reduces the risk of water erosion.

Interpretive Groups

Land capability classification: IVe, nonirrigated

116—Schnipper-Rogerson complex, 2 to 12 percent slopes

Composition

Schnipper soil and similar inclusions—65 percent
Rogerson soil and similar inclusions—25 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Schnipper soil—convex to plane areas of terraces; Rogerson soil—concave areas of terraces
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 10 to 14 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Schnipper Soil

Slope range: 2 to 12 percent
Typical profile:
0 to 7 inches—brown silt loam
7 to 15 inches—brown silty clay loam
15 to 30 inches—very pale brown silty clay loam

30 to 39 inches—thin lime- and silica-cemented hardpan over very pale brown gravelly silt loam
39 to 66 inches—light yellowish brown gravelly clay loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4 to 7 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Characteristics of the Rogerson Soil

Slope range: 2 to 6 percent
Typical profile:
0 to 4 inches—pale brown silt loam
4 to 15 inches—brown and pale brown silty clay
15 to 21 inches—very pale brown silty clay loam that is weakly cemented or moderately cemented in the upper part
21 to 44 inches—very pale brown silt loam
44 to 62 inches—very pale brown gravelly sandy loam
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 2.5 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Nawt and Stricker soils on breaks; Pigtail soils in depressional areas of terraces; soils that are deep to a hardpan, are silty clay loam over silty clay, and are on terraces; soils that are deep to a hardpan, are silt loam over silty clay loam over silt loam, and are on terraces; barren areas that are 10 to 20 feet in diameter and are saline, are shallow and clayey, or are subject to ant activity

Use and Management

Major use: Rangeland
Major management factors: Rogerson soil—depth to the hardpan, available water capacity, precipitation, hazard of water erosion; Schnipper soils—precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation and by the low available water capacity and shallow rooting depth of the Rogerson soil.
• Seeding is limited by the low precipitation and moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 10 to 13 inch precipitation zone

117—Scoon fine sandy loam, 1 to 4 percent slopes

Composition

Scoon soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,350 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Scoon Soil

Typical profile:
0 to 4 inches—light brownish gray fine sandy loam
4 to 13 inches—light brownish gray loam
13 to 43 inches—white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1.5 to 3.0 inches
Potential rooting depth: 8 to 20 inches
Runoff: Slow

Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem and Taunton soils on terraces, Blacknest and Rakane soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

118—Scoon loam, 0 to 2 percent slopes

Composition

Scoon soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Scoon Soil

Typical profile:
0 to 5 inches—light brownish gray loam
5 to 13 inches—light brownish gray loam
13 to 15 inches—light gray loam
15 to 40 inches—white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 8 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Taunton soils on terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Depth to the hardpan, available water capacity, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated

119—Scoon loam, 2 to 4 percent slopes

Composition

Scoon soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,350 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Scoon Soil

Typical profile:
0 to 6 inches—pale brown loam
6 to 15 inches—pale brown loam
15 to 19 inches—very pale brown loam
19 to 40 inches—white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 8 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Arbidge soils on lower lying terraces; Roseworth soils on terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

120—Shabliss silt loam, 1 to 4 percent slopes

Composition

Shabliss soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 4,400 to 4,900 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Shabliss Soil

Typical profile:
0 to 5 inches—brown silt loam
5 to 10 inches—light yellowish brown silt loam
10 to 17 inches—very pale brown silt loam
17 to 18 inches—white lime- and silica-cemented hardpan over very pale brown silt loam
18 to 31 inches—very pale brown silt loam
31 to 36 inches—white lime- and silica-cemented hardpan over very pale brown silt loam
36 to 68 inches—very pale brown and light yellowish brown silt loam
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Chiara and Colthorp soils on higher lying terraces, Portneuf and Sluka soils on terraces, Power and Rad soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.
• Roots are restricted below a depth of 12 to 20 inches because of the hardpan.
• Deep chiseling or ripping improves the rooting depth.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

121—Shabliss silt loam, 4 to 8 percent slopes

Composition

Shabliss soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 4,400 to 4,900 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Shabliss Soil

Typical profile:
0 to 3 inches—brown silt loam
3 to 15 inches—very pale brown silt loam
15 to 24 inches—white lime- and silica-cemented hardpan over very pale brown silt loam
24 to 60 inches—very pale brown silt loam
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 3.5 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Chiara soils on higher lying terraces, Portneuf and Sluka soils on terraces, Power soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, depth to the hardpan, available water capacity, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush

General management considerations:
• Forage production is limited by the low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by the slope, shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.
• Roots are restricted below a depth of 12 to 20 inches because of the hardpan.
• Deep chiseling or ripping improves the rooting depth.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

122—Shano silt loam, 1 to 4 percent slopes

Composition

Shano soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Shano Soil

Typical profile:
0 to 5 inches—brown silt loam
5 to 10 inches—yellowish brown silt loam
10 to 29 inches—light yellowish brown silt loam
29 to 66 inches—pale brown silt loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 11.0 to 12.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Bahem, Barrymore, Portneuf, Rad, and Sluka soils on higher lying terraces; Dolman and Paulville soils on terraces

Use and Management

Major use: Irrigated cropland
Major management factors: None
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated

123—Sluka silt loam, 1 to 4 percent slopes

Composition

Sluka soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Sluka Soil

Typical profile:
0 to 14 inches—pale brown silt loam
14 to 22 inches—white silt loam
22 to 39 inches—white lime- and silica-cemented hardpan over very pale brown silt loam

39 to 72 inches—pale brown loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Minidoka, and Portneuf soils on terraces; Minveno soils on higher lying terraces; Owsel, Paulville, and Rad soils on lower lying terraces; Tulch soils on stream terraces

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, hazard of wind erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.
• The risk of wind erosion is reduced by maintaining crop residue on the surface, keeping tillage at a minimum, and keeping the surface of the soil rough.

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIs, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

124—Sluka silt loam, 4 to 8 percent slopes

Composition

Sluka soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Sluka Soil

Typical profile:
0 to 4 inches—pale brown silt loam
4 to 21 inches—very pale brown silt loam
21 to 37 inches—white lime- and silica-cemented hardpan over pale brown loam
37 to 51 inches—pale brown very fine sandy loam
51 to 61 inches—white lime- and silica-cemented hardpan over pale brown loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem, Minidoka, Portneuf, and Shabliss soils on terraces; Barrymore soils on higher lying terraces; Shano soils on lower lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.

• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by slope and the moderate hazards of water and wind erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

125—Sluka silt loam, 8 to 12 percent slopes

Composition

Sluka soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Sides of terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Sluka Soil

Typical profile:
0 to 8 inches—light brownish gray silt loam
8 to 24 inches—pale brown silt loam
24 to 60 inches—white lime- and silica-cemented hardpan over very pale brown loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Bahem soils on the sides of terraces, areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

126—Sluka-Purdam association, 15 to 50 percent slopes

Composition

Sluka soil and similar inclusions—50 percent
Purdam soil and similar inclusions—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Sluka soil—plane areas of back slopes; Purdam soil—concave areas of back slopes
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Sluka Soil

Slope range: 15 to 50 percent
Typical profile:

0 to 4 inches—light brownish gray silt loam
4 to 23 inches—very pale brown silt loam
23 to 50 inches—lime- and silica-cemented hardpan over very pale brown silt loam
50 to 64 inches—pale brown sandy loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Rapid
Hazard of water erosion: Severe
Hazard of wind erosion: Moderate

Characteristics of the Purdam Soil

Slope range: 15 to 30 percent
Typical profile:
0 to 5 inches—brown silt loam
5 to 18 inches—pale brown silt loam
18 to 27 inches—pale brown silty clay loam
27 to 38 inches—very pale brown loam
38 to 65 inches—lime- and silica-cemented hardpan over very pale brown very fine sandy loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 4.5 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Rapid
Hazard of water erosion: Severe
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem soils on the sides of terraces, Blacknest and Rakane soils on lower lying terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, slope, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by slope, by the severe hazard of water erosion, and by the moderate hazard of wind erosion on the Sluka soil.
• The use of equipment is limited by slope.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Loamy, 8 to 10 inch precipitation zone

127—Stricker-Nawt-Rock outcrop association, 15 to 30 percent slopes

Composition

Stricker soil and similar inclusions—40 percent
Nawt soil and similar inclusions—30 percent
Rock outcrop—15 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Stricker soil—north- and east-facing slopes of breaks; Nawt soil—south- and west-facing slopes of breaks
Elevation: 4,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 46 to 50 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Stricker Soil

Typical profile:
0 to 3 inches—brown very stony loam
3 to 6 inches—brown gravelly silt loam
6 to 16 inches—brown very gravelly silt loam
16 to 30 inches—very pale brown extremely cobbly loam
30 to 60 inches—very pale brown very cobbly loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4.0 to 5.5 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Severe

Characteristics of the Nawt Soil

Typical profile:
0 to 3 inches—brown extremely stony loam
3 to 8 inches—brown gravelly clay
8 to 35 inches—yellowish brown gravelly silty clay
35 to 44 inches—pale brown gravelly silt loam

44 to 60 inches—decomposing bedrock
Depth class: Deep to bedrock
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 7.0 inches
Potential rooting depth: 40 to 60 inches
Runoff: Rapid
Hazard of water erosion: Severe
Shrink-swell potential: High

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Sharp, angular cliffs and rimrock that border lower lying valley terraces and large, angular fragments that separated from the cliffs and rimrock and were randomly deposited downslope

Contrasting Inclusions

Bahem, Chuska, Kecko, and Schnipper soils on lower lying terraces; Congle soils on north- and east-facing foot slopes and back slopes; Gosinta soils on alluvial terraces; Mackey soils on dip slopes; very deep cobbly loam on breaks; soils that are moderately deep to bedrock, are very stony loam over very gravelly loam, and are on breaks; soils that are moderately deep to bedrock, are very stony loam over very gravelly clay, and are on breaks; outcroppings of limestone near Nat-Soo-Pah; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Rock fragments in the surface layer, areas of Rock outcrop, hazard of water erosion
Dominant vegetation in natural potential plant community: Stricker and Nawt soils—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Seeding is limited by the rock fragments in the surface layer, severe hazard of water erosion, and areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Stricker and Nawt soils—Stony loam, 12 to 16 inch precipitation zone

128—Stricker-Nawt-Rock outcrop association, 30 to 75 percent slopes

Composition

Stricker soil and similar inclusions—45 percent
Nawt soil and similar inclusions—25 percent
Rock outcrop—20 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Stricker soil—north- and east-facing slopes of breaks; Nawt soil—south- and west-facing slopes of breaks (fig. 9)

Figure 9.—Area of Stricker-Nawt-Rock outcrop association, 30 to 75 percent slopes. Stricker soil is on north and east aspects, and Nawt soil is on west and south aspects.

Elevation: 4,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 46 to 50 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Stricker Soil

Typical profile:
0 to 3 inches—grayish brown very stony loam
3 to 12 inches—brown gravelly loam
12 to 22 inches—pale brown extremely cobbly loam

22 to 29 inches—very pale brown extremely cobbly loam
29 to 61 inches—very pale brown extremely cobbly sandy loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 4.0 to 5.5 inches
Potential rooting depth: 60 inches or more
Runoff: Rapid
Hazard of water erosion: Very severe

Characteristics of the Nawt Soil

Typical profile:
0 to 5 inches—brown extremely stony loam
5 to 18 inches—brown gravelly clay
18 to 36 inches—light yellowish brown gravelly clay
36 to 45 inches—very pale brown very gravelly clay loam
45 to 62 inches—decomposing bedrock
Depth class: Deep to bedrock
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 7.0 inches
Potential rooting depth: 40 to 60 inches
Runoff: Rapid
Hazard of water erosion: Very severe
Shrink-swell potential: High

Characteristics of the Rock Outcrop

Kind of rock: Exposed welded tuff
Description of areas: Sharp, angular cliffs and rimrock that border lower lying valley terraces and large, angular fragments that separated from the cliffs and rimrock and were randomly deposited downslope

Contrasting Inclusions

Doodlelink soils on north- and east-facing slopes of breaks; Flatron and Ragpie soils on ridges; Gosinta soils on alluvial terraces; Mackey soils on dip slopes; very deep stony loam on breaks; soils that are moderately deep to bedrock, are very stony loam over very cobbly loam, and are on breaks; soils that are moderately deep to bedrock, are very stony loam over gravelly clay, and are on breaks; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Slope, rock fragments in the surface layer, areas of Rock outcrop, hazard of water erosion
Dominant vegetation in natural potential plant community: Nawt and Stricker soils—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Seeding is limited by the slope, rock fragments in the surface layer, areas of Rock outcrop, and very severe hazard of water erosion.
• The use of equipment is limited by the slope, rock fragments in the surface layer, and areas of Rock outcrop.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Stricker and Nawt soils—South slope stony, 10 to 13 inch precipitation zone

129—Suepert-Taunton complex, 1 to 15 percent slopes

Composition

Suepert soil and similar inclusions—60 percent
Taunton soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Suepert soil—convex areas of terraces; Taunton soil—concave or plane areas of terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 50 to 52 degrees F
Frost-free season: 130 to 140 days

Characteristics of the Suepert Soil

Slope range: 1 to 15 percent
Typical profile:
0 to 8 inches—yellowish brown extremely stony silt loam
8 to 18 inches—yellowish brown very cobbly silt loam

18 to 32 inches—yellowish brown extremely cobbly silt loam
32 to 48 inches—white very cobbly lime- and silica-cemented hardpan
48 to 80 inches—lime-coated gravel, cobbles, and stones
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 1.5 to 2.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight

Characteristics of the Taunton Soil

Slope range: 1 to 8 percent
Typical profile:
0 to 19 inches—pale brown fine sandy loam
19 to 36 inches—light gray sandy loam
36 to 44 inches—white lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Banbury soils on higher lying terraces; Minidoka, Paulville, and Scoon soils on lower lying terraces; areas of Rock outcrop

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer of the Suepert soil, hazard of wind erosion on the Taunton soil
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation, the rock fragments in the surface layer of the Suepert soil, and the moderate hazard of wind erosion on the Taunton soil.
• The use of equipment is limited by the rock fragments in the surface layer of the Suepert soil.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Loamy, 8 to 12 inch precipitation zone

130—Tanner silt loam, 1 to 10 percent slopes

Composition

Tanner soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 5,200 to 5,900 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Tanner Soil

Typical profile:
0 to 3 inches—brown silt loam
3 to 16 inches—brown silty clay loam
16 to 22 inches—pale brown cobbly silty clay
22 to 35 inches—very pale brown loam
35 to 51 inches—white fractured lime- and silica-cemented hardpan
51 inches—bedrock
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Aninto and Oshone soils on lower lying terraces; Budlewis, Chayson, and Forvic soils on higher lying terraces; soils that are moderately deep to bedrock, are silt loam over silty clay loam over silty clay, and are on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, basin big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVe, nonirrigated
Range site: Loamy, 11 to 13 inch precipitation zone

131—Tanner-Pigtail complex, 1 to 8 percent slopes

Composition

Tanner soil and similar inclusions—60 percent
Pigtail soil and similar inclusions—30 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Tanner soil—convex areas of terraces, Pigtail soil—plane or concave areas of terraces
Elevation: 5,300 to 5,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Tanner Soil

Slope range: 1 to 8 percent
Typical profile:
0 to 5 inches—grayish brown silt loam
5 to 14 inches—brown silty clay
14 to 26 inches—very pale brown silt loam
26 to 46 inches—white fractured lime- and silica-cemented hardpan
46 to 65 inches—very pale brown sandy loam
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Characteristics of the Pigtail Soil

Slope range: 1 to 3 percent
Typical profile:
0 to 3 inches—pale brown silt loam
3 to 7 inches—pale brown silty clay loam
7 to 18 inches—pale brown silty clay
18 to 32 inches—very pale brown loam
32 to 60 inches—white fractured lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Very slow
Available water capacity: 4.0 to 7.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: High

Contrasting Inclusions

Elijah soils on higher lying terraces; soils that are moderately deep to bedrock, are silt loam over silty clay over silt loam, and are in convex areas of terraces; soils that are moderately deep to a hardpan, are silt loam, and are in convex areas of terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to the clayey subsoil in the Pigtail soil, hazard of water erosion on the Tanner soil
Dominant vegetation in natural potential plant community: Tanner soil—bluebunch wheatgrass, Wyoming big sagebrush; Pigtail soil—Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation and the shallow depth to the clayey subsoil in the Pigtail soil.
• Plant rooting depth is limited to the upper part of the Pigtail soil because of the claypan.
• Seeding is limited by low precipitation and by

the moderate hazard of water erosion on the Tanner soil.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Tanner soil—Loamy, 10 to 13 inch precipitation zone; Pigtail soil—Slick spot sodic, 8 to 12 inch precipitation zone

132—Taunton sandy loam, 1 to 4 percent slopes

Composition

Taunton soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,700 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Taunton Soil

Typical profile:
0 to 3 inches—brown sandy loam
3 to 12 inches—brown fine sandy loam
12 to 29 inches—pale brown fine sandy loam
29 to 38 inches—very pale brown gravelly loam
38 to 52 inches—white fractured lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Emberton and Kecko soils on lower lying terraces

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IIIs, irrigated, and VIs, nonirrigated

133—Taunton sandy loam, 4 to 8 percent slopes

Composition

Taunton soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 3,700 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Taunton Soil

Typical profile:
0 to 5 inches—pale brown sandy loam
5 to 22 inches—brown fine sandy loam
22 to 36 inches—pale brown fine sandy loam
36 inches—white lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3.5 to 6.5 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Jestrick and Kecko soils on terraces, areas of Rock outcrop

Use and Management

Major use: Irrigated cropland
Major management factors: Slope, hazard of water erosion, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by slope and the moderate hazards of water and wind erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated

134—Taunton silt loam, 2 to 4 percent slopes

Composition

Taunton soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,700 to 4,100 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Taunton Soil

Typical profile:
0 to 5 inches—pale brown silt loam
5 to 19 inches—pale brown silt loam
19 to 36 inches—very pale brown loam
36 inches—white lime- and silica-cemented hardpan
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 3 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate

Contrasting Inclusions

Minveno and Sluka soils on terraces

Use and Management

Major use: Irrigated cropland
Major management factor: Hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IIIe, irrigated, and VIe, nonirrigated

135—Tock loam, 1 to 6 percent slopes

Composition

Tock soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,200 to 5,600 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free season: 90 to 100 days

Characteristics of the Tock Soil

Typical profile:
0 to 4 inches—pale brown loam
4 to 13 inches—brown silty clay loam
13 to 30 inches—yellowish brown silty clay
30 to 36 inches—light yellowish brown lime- and silica-cemented hardpan
36 to 60 inches—multicolored sand and gravel
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Slow
Available water capacity: 3.5 to 6.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Shrink-swell potential: High

Contrasting Inclusions

Chuska soils on lower lying terraces, Oshone soils on higher lying terraces, very deep silt loam on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Loamy, 10 to 13 inch precipitation zone

136—Trevino silt loam, 0 to 2 percent slopes

Composition

Trevino soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Trevino Soil

Typical profile:
0 to 3 inches—light brownish gray silt loam
3 to 11 inches—light brownish gray silt loam
11 to 18 inches—light gray silt loam
18 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight

Contrasting Inclusions

Minveno soils on higher lying terraces; soils that are moderately deep to bedrock, are silt loam, and are on terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Depth to bedrock, available water capacity
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth and low available water capacity.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated

137—Trevino silt loam, 2 to 8 percent slopes

Composition

Trevino soil and similar inclusions—95 percent
Contrasting inclusions—5 percent

Setting

Position on landscape: Terraces
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Trevino Soil

Typical profile:
0 to 5 inches—pale brown silt loam
5 to 10 inches—brown silt loam
10 to 16 inches—very pale brown silt loam
16 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate

Contrasting Inclusions

Minveno soils on higher lying terraces; soils that are moderately deep to bedrock, are silt loam, and are on terraces

Use and Management

Major uses: Irrigated cropland, rangeland
Major management factors: Precipitation, depth to bedrock, available water capacity, slope, hazard of water erosion

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Sprinkler irrigation is best suited to this soil, but surface irrigation can be used if the water is regulated to control erosion.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, slope, and moderate hazard of water erosion.

Rangeland

Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazard of water erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated
Range site: Shallow loamy, 8 to 12 inch precipitation zone

138—Trevino-Rock outcrop complex, 2 to 20 percent slopes

Composition

Trevino soil and similar inclusions—70 percent
Rock outcrop—20 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Trevino Soil

Slope range: 2 to 20 percent
Typical profile:
0 to 4 inches—pale brown silt loam
4 to 14 inches—pale brown silt loam
14 to 18 inches—light brownish gray silt loam
18 inches—bedrock
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2.5 to 4.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate

Characteristics of the Rock Outcrop

Kind of rock: Exposed basalt
Description of areas: Sharp, angular to semirounded, long, narrow, lava flow pressure ridges ranging to semirounded outcroppings that extend 1 foot to 10 feet above the adjacent landscape

Contrasting Inclusions

Minveno soils on higher lying terraces, very shallow silt loam on terraces

Use and Management

Major use: Rangeland
Major management factors: Precipitation, depth to bedrock, available water capacity, areas of Rock outcrop, hazard of water erosion
Dominant vegetation in natural potential plant community: Trevino soil—bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by the low precipitation, areas of Rock outcrop, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Trevino soil—Shallow loamy, 8 to 12 inch precipitation zone

139—Tucker silt loam, 0 to 2 percent slopes

Composition

Tucker soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces and flood plains
Elevation: 5,200 to 6,500 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free season: 80 to 100 days

Characteristics of the Tucker Soil

Typical profile:
0 to 6 inches—dark grayish brown silt loam
6 to 11 inches—dark grayish brown silty clay loam
11 to 32 inches—dark grayish brown silty clay
32 to 70 inches—gray silty clay
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow
Available water capacity: 9.5 to 11.0 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Depth to water table: 18 to 36 inches
Frequency of flooding: Rare
Shrink-swell potential: High

Contrasting Inclusions

Zola soils on higher lying terraces; very deep, poorly drained soils that are silt loan over silty clay loam over silty clay and are in depressional areas of lower lying terraces; very deep, well drained loam on higher lying terraces

Use and Management

Major use: Rangeland
Major management factor: Wetness
Dominant vegetation in natural potential plant community: Slender wheatgrass, sedges
General management considerations:
- Seeding is limited by wetness.
- Plants that tolerate wetness are suitable for seeding.
- Grazing should be delayed until the soil is adequately drained and is firm enough to withstand tramping by livestock.

Interpretive Groups

Land capability classification: IIIw, nonirrigated
Range site: Semi-wet meadow

140—Tulch silt loam, 0 to 2 percent slopes

Composition

Tulch soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Stream terraces
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Tulch Soil

Typical profile:
0 to 3 inches—brown silt loam
3 to 9 inches—pale brown silt loam
9 to 38 inches—pale brown silty clay loam
38 to 70 inches—very pale brown silty clay loam
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 10 to 12 inches
Potential rooting depth: 60 inches or more
Runoff: Slow

Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Paulville and Shano soils on lower lying terraces; Portneuf and Sluka soils on higher lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland
Major management factors: Precipitation, permeability

Rangeland

Dominant vegetation in natural potential plant community: Basin wildrye, basin big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: IIc, irrigated, and VIc, nonirrigated
Range site: Loamy bottom, 8 to 14 inch precipitation zone

141—Udaho very gravelly loam, 10 to 30 percent slopes

Composition

Udaho soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Hillsides
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Udaho Soil

Typical profile:
0 to 7 inches—pale brown very gravelly loam
7 to 29 inches—white very gravelly sandy loam
29 to 60 inches—partially consolidated volcanic ash
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 5 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Medium
Hazard of water erosion: Moderate
Salinity: Moderate between depths of 7 and 29 inches

Contrasting Inclusions

Ackett soils on stream terraces; Chuska, Lankbush, and Weash soils on lower lying terraces; soils that are moderately deep to bedrock, are gravelly loam over gravelly sandy loam, and are on hillsides; soils that are shallow to bedrock, are very gravelly loam over very gravelly sandy loam, and are on hillsides; areas of Rock outcrop; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer, hazard of water erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• Seeding is limited by the low precipitation, rock

fragments in the surface layer, and moderate hazard of water erosion.

Interpretive Groups

Land capability classification: VIIs, nonirrigated
Range site: Stony loam, 12 to 16 inch precipitation zone

142—Udaho very gravelly loam, 30 to 65 percent slopes

Composition

Udaho soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Breaks
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Udaho Soil

Typical profile:
0 to 7 inches—pale brown very gravelly loam
7 to 31 inches—very pale brown very gravelly loam
31 to 60 inches—partially consolidated volcanic ash
Depth class: Moderately deep to bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Available water capacity: 5 to 6 inches
Potential rooting depth: 20 to 40 inches
Runoff: Rapid
Hazard of water erosion: Severe
Salinity: Moderate between depths of 7 and 31 inches

Contrasting Inclusions

Soils that are shallow to bedrock, are very stony loam over gravelly clay, and are on breaks; soils that are shallow to bedrock, are very gravelly loam, and are on breaks; areas of Rock outcrop; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Precipitation, rock fragments in the surface layer, slope, hazard of water erosion
Dominant vegetation in natural potential plant community: Indian ricegrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation.
• The use of forage is limited by slope.
• Seeding is limited by low precipitation, rock fragments in the surface layer, slope, and the severe hazard of water erosion.
• The use of equipment is limited by slope.

Interpretive Groups

Land capability classification: VIIe, nonirrigated
Range site: Ashy south slope, 10 to 16 inch precipitation zone

143—Wagonjacket silt loam, 0 to 1 percent slopes

Composition

Wagonjacket soil and similar inclusions—80 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Flood plains
Elevation: 5,600 to 5,800 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free season: 90 to 105 days

Characteristics of the Wagonjacket Soil

Typical profile:
0 to 3 inches—dark gray silt loam
3 to 11 inches—gray silt loam
11 to 26 inches—grayish brown silt loam
26 to 46 inches—light brownish gray silt loam
46 to 61 inches—light gray gravelly sandy loam
61 to 70 inches—multicolored sand and gravel
Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Available water capacity: 8 to 10 inches

Potential rooting depth: 60 inches or more
Runoff: Very slow
Hazard of water erosion: Slight
Depth to water table: 18 to 30 inches
Frequency of flooding: Frequent

Contrasting Inclusions

Tucker soils on flood plains; Zola soils on higher lying terraces; very deep, poorly drained soils that are silt loam over silty clay loam over silty clay and are in depressional areas of lower lying terraces; somewhat poorly drained soils that are moderately deep to sand and gravel, are loam over sandy loam, and are on flood plains

Use and Management

Major use: Rangeland
Major management factors: Wetness
Dominant vegetation in natural potential plant community: Slender wheatgrass, sedges
General management considerations:
• Seeding is limited by wetness.
• Plants that tolerate wetness are suitable for seeding.
• Grazing should be delayed until the soil is adequately drained and is firm enough to withstand tramping by livestock.

Interpretive Groups

Land capability classification: IVw, nonirrigated
Range site: Semi-wet meadow

144—Weash gravelly sandy loam, 2 to 12 percent slopes

Composition

Weash soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces
Elevation: 5,400 to 5,700 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free season: 100 to 110 days

Characteristics of the Weash Soil

Typical profile:
0 to 2 inches—pale brown gravelly sandy loam
2 to 8 inches—brown sandy clay loam
8 to 12 inches—brown clay loam
12 to 60 inches—white weakly consolidated volcanic ash
Depth class: Shallow to bedrock
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 1.5 to 3.0 inches
Potential rooting depth: 10 to 20 inches
Runoff: Medium
Hazard of water erosion: Moderate
Hazard of wind erosion: Moderate

Contrasting Inclusions

Arbidge soils on lower lying terraces; Chuska and Lankbush soils on higher lying terraces; Udaho soils on hillsides; soils that are moderately deep to bedrock, are gravelly sandy loam over clay loam, and are on the sides of terraces; outcroppings of volcanic ash

Use and Management

Major use: Rangeland
Major management factors: Precipitation, available water capacity, hazard of water erosion, hazard of wind erosion
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush
General management considerations:
• Forage production is limited by low precipitation, shallow rooting depth, and low available water capacity.
• Seeding is limited by low precipitation and the moderate hazards of water and wind erosion.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Interpretive Groups

Land capability classification: VIs, nonirrigated
Range site: Shallow loamy upland, 10 to 14 inch precipitation zone

145—Windypoint-Arbidge complex, 1 to 4 percent slopes

Composition

Windypoint soil and similar inclusions—50 percent

Arbidge soil and similar inclusions—30 percent
Contrasting inclusions—20 percent

Setting

Position on landscape: Terraces
Elevation: 4,400 to 4,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 110 to 120 days

Characteristics of the Windypoint Soil

Typical profile:
0 to 3 inches—pale brown loam
3 to 28 inches—pale brown gravelly loam
28 to 34 inches—light gray extremely gravelly sandy loam
34 to 65 inches—multicolored sand and gravel
Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Available water capacity: 5 to 7 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Characteristics of the Arbidge Soil

Typical profile:
0 to 24 inches—pale brown loam
24 to 36 inches—white lime- and silica-cemented hardpan
36 to 64 inches—multicolored extremely gravelly sand
Depth class: Moderately deep to a hardpan
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: 2.5 to 5.0 inches
Potential rooting depth: 20 to 40 inches
Runoff: Slow
Hazard of water erosion: Slight
Shrink-swell potential: Moderate

Contrasting Inclusions

Blacknest, Paulville, and Taunton soils on terraces; Chuska, Colthorp, and Shabliss soils on higher lying terraces

Use and Management

Major uses: Rangeland, irrigated cropland (fig. 10)

Figure 10.—Area of Windypoint-Arbidge complex, 1 to 4 percent slopes. Potatoes on Windypoint soil in foreground.

Major management factors: Precipitation, permeability

Rangeland

Dominant vegetation in natural potential plant community: Thurber needlegrass, Wyoming big sagebrush
General management considerations:
• Forage production and seeding are limited mainly by low precipitation.
• Seeding generally is most successful late in fall; however, it may not be successful in years when precipitation is below average during the growing season.

Irrigated Cropland

General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Because of the moderately slow permeability, the application of irrigation water should be adjusted to the water intake rate.

Interpretive Groups

Land capability classification: VIs, nonirrigated, and IIIs, irrigated
Range site: Loamy, 8 to 10 inch precipitation zone

146—Yahoo silt loam, 0 to 1 percent slopes

Composition

Yahoo soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,400 to 4,300 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Yahoo Soil

Typical profile:
0 to 3 inches—pale brown silt loam
3 to 12 inches—pale brown silty clay loam
12 to 20 inches—white lime- and silica-cemented hardpan over very pale brown loam
20 to 32 inches—very pale brown loam
32 to 34 inches—white lime- and silica-cemented hardpan over light gray loam
34 to 60 inches—fractured white lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 12 to 20 inches
Runoff: Very slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Bahem, Purdam, and Sluka soils on higher lying terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Depth to the hardpan, available water capacity, hazard of wind erosion
General management considerations:
• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IVs, irrigated, and VIs, nonirrigated

147—Yahoo silt loam, 1 to 4 percent slopes

Composition

Yahoo soil and similar inclusions—90 percent
Contrasting inclusions—10 percent

Setting

Position on landscape: Terraces
Elevation: 3,400 to 4,300 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free season: 120 to 140 days

Characteristics of the Yahoo Soil

Typical profile:
0 to 3 inches—pale brown silt loam
3 to 9 inches—brown silt loam
9 to 14 inches—very pale brown silt loam
14 to 34 inches—white lime- and silica-cemented hardpan over very pale brown fine sandy loam
34 to 60 inches—fractured lime- and silica-cemented hardpan
Depth class: Shallow to a hardpan
Drainage class: Well drained
Permeability: Moderate
Available water capacity: 2 to 4 inches
Potential rooting depth: 12 to 20 inches
Runoff: Slow
Hazard of water erosion: Slight
Hazard of wind erosion: Moderate
Shrink-swell potential: Moderate

Contrasting Inclusions

Purdam, Roseworth, and Sluka soils on higher lying terraces

Use and Management

Major use: Irrigated cropland
Major management factors: Depth to the

hardpan, available water capacity, hazard of wind erosion

General management considerations:

• Most climatically suited crops can be grown if irrigation water is provided.
• Surface and sprinkler irrigation systems are suited to this soil.
• Production of irrigated crops is limited by the shallow rooting depth, low available water capacity, and moderate hazard of wind erosion.

Interpretive Groups

Land capability classification: IVe, irrigated, and VIe, nonirrigated

148—Zola loam, 0 to 2 percent slopes

Composition

Zola soil and similar inclusions—85 percent
Contrasting inclusions—15 percent

Setting

Position on landscape: Terraces and flood plains
Elevation: 5,200 to 5,800 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free season: 80 to 100 days

Characteristics of the Zola Soil

Typical profile:

0 to 5 inches—grayish brown loam
5 to 13 inches—dark grayish brown loam
13 to 21 inches—brown loam
21 to 28 inches—grayish brown clay loam
28 to 39 inches—gray clay loam
39 to 54 inches—very dark grayish brown clay
54 to 70 inches—light yellowish brown gravelly sandy clay

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Available water capacity: 9.5 to 11.5 inches
Potential rooting depth: 60 inches or more
Runoff: Slow
Hazard of water erosion: Slight
Depth to water table: 48 to 72 inches
Frequency of flooding: Rare
Shrink-swell potential: High

Contrasting Inclusions

Tucker soils on lower lying terraces; very deep, poorly drained soils that are silt loam over silty clay and are in depressional areas of lower lying terraces; very deep sandy loam on terraces and flood plains

Use and Management

Major use: Rangeland
Major management factors: None
Dominant vegetation in natural potential plant community: Bluebunch wheatgrass, Wyoming big sagebrush

Interpretive Groups

Land capability classification: IIIc, nonirrigated
Range site: Loamy, 10 to 13 inch precipitation zone

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pasture land, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 611,380 acres, or about 39 percent, of the survey area would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in this section. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

The map units that meet the requirements for prime farmland, if irrigated, are:

7 Arbidge sandy loam, 1 to 4 percent slopes
10 Bahem silt loam, 1 to 4 percent slopes
17 Barrymore silt loam, 1 to 4 percent slopes
18 Barrymore-Starbuck complex, 1 to 4 percent slopes
19 Bluegulch gravelly loam, 2 to 12 percent slopes
23 Budlewis-Chayson complex, 2 to 6 percent slopes
24 Budlewis-Tanner complex, 2 to 6 percent slopes
33 Dolman silt loam, 1 to 4 percent slopes
40 Elijah silt loam, 2 to 4 percent slopes
46 Gosinta silt loam, 0 to 2 percent slopes
47 Harsan fine sandy loam, 1 to 4 percent slopes
50 Hoosegow-Sidlake-Rock outcrop complex, 2 to 15 percent slopes
51 Howcree-Ibola complex, 2 to 6 percent slopes
53 Isknat loam, 2 to 8 percent slopes
58 Kecko fine sandy loam, 1 to 4 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Prepared by Dal Ames, soil scientist, Natural Resources Conservation Service.

This section provides information on the management of soils in the survey area for crops and pasture. The crops and pasture plants best suited to the soils are identified, the system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are given for each soil. Planners of management systems for individual fields or farms should consider the detailed information given in the section “Detailed Soil Map Units.”

In 1991 approximately 459,000 acres in the survey area was used for crops and pasture. Of this total, 144,000 acres was used for row crops, 215,000 acres was used for close-grown crops, and 100,000 acres was used for alfalfa hay or pasture plants. Because livestock operations are a major part of the economy in the area, about 30 percent of the irrigated land is used for improved pasture plants, hay, grain, and silage for livestock. The potential for converting rangeland into irrigated cropland depends on the availability of irrigation water and the feasibility of delivering the water to the area. Small areas of variable soils in Jerome County are isolated by areas of Rock outcrop and presently are not farmed.

Major crops include winter wheat, spring wheat, barley, potatoes, dry beans, sugar beets, alfalfa hay, sweet corn, and corn silage. A small acreage is used for fruit orchards and specialty seed crops. The warmer climatic conditions on the alluvial terraces along the Snake River and on the side slopes of the Snake River Canyon allow for a more extensive crop selection. The latest information and suggestions for growing

crops can be obtained from local offices of the Cooperative Extension Service and the Natural Resources Conservation Service.

Soil erosion reduces crop production and increases stream pollution. As the surface layer of the soils erodes, productivity decreases and the sediment deteriorates the quality of water for municipal and recreational use. Irrigation and cultivation increase the risk of soil erosion, but suitable conservation practices help to minimize the risk.

Surface and sprinkler irrigation methods are used in the survey area. The surface methods used include corrugation, furrow, and border systems. Irrigation water management includes practices such as installing ditches, lining pipelines, reorganizing fields, and installing water conveyance systems and water control structures. The application of irrigation water should be based on the available water capacity and water intake rate of the soils and on the needs of the crops grown. The soil moisture content should be maintained so that it is neither too wet nor too dry. Irrigation should wet the root zone but not the underlying strata.

If properly designed and operated, center-pivot welling and handiness sprinkler irrigation systems apply water more efficiently than surface irrigation methods. Improper system design can result in overirrigation and excessive runoff and erosion. Proper irrigation water management minimizes soil erosion.

Studies indicate that the topsoil of many soils in the survey area has been eroded as a result of irrigation. The risk of erosion is highest in areas of surface irrigated row crops such as beans, corn, and potatoes. Conservation tillage to maintain crop residue on the surface can reduce soil loss by as much as 50 to 90 percent.

Many of the soils used as cropland are subject to a high hazard of wind erosion. Special practices are needed to protect these soils.. The risk of wind erosion is highest between February and June. Conservation tillage practices that maintain a protective cover on the soil surface are critical during this period.

Wind erosion can occur when the soil is dry and is barren of vegetation or plant residue. Cropping systems that maintain plant cover or surface mulch or that keep the surface rough through minimum tillage or no-till methods reduce the risk of wind erosion. Windbreaks of adapted trees and shrubs and grass barriers also reduce the risk of wind erosion and provide cover for wildlife and as well as esthetic value. Information on the design of erosion control measures for individual soils is available in the local office of the Natural Resources Conservation Service.

Good soil tilth, which affects seed germination and water infiltration, is characterized by a granular, porous soil structure. It can be achieved through proper farming practices such as rotating crops, adding organic matter to the soil, and minimizing tillage. Crops should be grown in a regular rotation that includes grains and legumes or a mixture of legumes and grasses. Grain can be grown as a companion crop into which a hay or pasture mixture is seeded. The organic matter content of most of the cropland in the area is naturally low. Regular additions of green manure, crop residue, and farm manure increase the organic matter content and improve soil structure and water infiltration. All crop litter should be returned to the soil. Light applications of farm manure result in uniform crop growth. Returning large amounts of organic residue to the soil can cause a temporary shortage of nitrogen.

The availability of adequate soil nutrients depends on the previous crops grown and the cultural practices used. Farm manure provides some nitrogen, potash, and phosphate, but balanced fertilizer is essential to maintaining high production. All crops respond to nitrogen and phosphorus, but some crops also need minor elements such as zinc. Nitrogen can be applied with irrigation water, but excessive fertilization can result in serious pollution of surface water and groundwater. Sulfur deficiencies are rare in areas irrigated with water from the Snake River. Soil tests are needed to determine specific fertilizer needs. The Cooperative Extension Service can help to determine the kind and amount of fertilizer needed.

Subsoiling can improve yields on soils that have a restrictive layer by increasing the effective rooting depth, improving internal water infiltration and drainage, and reducing runoff. Subsoiling only in areas where crop residue is maintained on the surface helps to protect the soil. Subsoiling should penetrate the compacted layer, and it should be done across the slope. Shallow soils and soils that allow moisture to escape through deep substrata should not be subsoiled.

Excess salts generally reduce crop yields. Because soil reclamation is difficult, time-consuming, and expensive, salt-tolerant crops

should be considered for use in areas of excess salts. Specific information can be obtained from the local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Practices needed to produce a variety of high-quality forage plants on pastureland include use of proper stocking rates, good soil and irrigation water management, and weed and rodent control. Cross-fencing and rotation grazing are needed to allow for periods of regrowth. During the grazing season, pastures should be grazed and irrigated to meet the needs of the plant grown. Grazing should be deferred while the pastures are irrigated.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system *(14)*, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

Prepared by Brian Miller, district conservationist, Natural Resources Conservation Service, Gooding, Idaho.

Approximately 1,000,000 acres, or about 65 percent, of the soil survey area is rangeland. Of this, about 60 percent is managed by the Bureau of Land Management, 35 percent by private ranchers, and 5 percent by the Department of Lands, State of Idaho.

Commercial livestock enterprises, including cow-calf operations, dairies, feedlots, and purebred cattle and sheep operations, account for almost one-half of the agricultural income in the survey area. Ranch sizes vary, but they generally consist of 2,000 to 5,000 acres of private land and grazing privileges on Federal and State land. Grazing occurs in spring, summer, and fall. In mid-December, or earlier if grazeable rangeland forage is depleted, livestock are moved to pastures, stubble fields, or drylots.

Typically, livestock are fed ranch-raised alfalfa and grass hay from mid-November until the range is suitable for grazing in April. Crop aftermath provides a significant amount of forage through fall and into winter. During open winters, livestock can graze in pastures of crested wheatgrass and only supplements are needed until spring.

The rangeland is suitable for grazing early in April in the lower lying, northern areas and early in June in the higher lying, southern areas. Rotation grazing systems that include periods of rest are common in the drier, lower lying areas, and deferred rotation systems are common in areas used in summer. About 25 percent of the livestock graze in areas of rangeland outside the survey area in summer.

Historically, rangeland consisted of a mixed stand of bunchgrasses, forbs, and shrubs. Climatic factors dictated the diversity of the plant community, with lower lying terraces supporting Thurber needlegrass and Wyoming big sagebrush and higher lying uplands supporting mainly bluebunch wheatgrass, Idaho fescue, and mountain big sagebrush. Overgrazing reduced or eliminated many of the perennial plants, and annuals and shrubs increased. Because forage production was reduced, rangeland seeding became an economic necessity. Presently, native vegetation exists only in isolated areas protected from grazing. Suitable management practices for specific range sites can be used to increase rangeland productivity.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between soils and vegetation and water.

Table 6 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in the follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was ascertained during this survey; thus, range sites

generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal water table are also important.

Total annual production is the amount of vegetation that can be expected to grow annually on rangeland. It includes all vegetation, including grasses, forbs, and the current year's growth of leaves, twigs, and fruit of woody plants. It does not include the increase in stem diameter of trees and shrubs, the production from previous years, or the underground growth. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Production is expressed in pounds per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation is the grasses, forbs, and shrubs that make up most of the natural potential plant community. It is listed by common name for each soil. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and the grazing season.

Range management requires a knowledge of the kinds of soil and of the natural potential plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the natural potential plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning for a given use.

The objective in range management is to manipulate the use of rangeland to maintain its potential for producing forage for livestock and wildlife and for providing wildlife habitat, water, watershed production, recreational use, and other uses. Sometimes rangeland managed below its potential meets grazing needs, provides wildlife habitat, protects soil and water resources, and meets other management objectives.

A planned grazing system increases forage production by allowing forage species to produce nutrients for growth and maintenance. Plants need adequate spring growth before grazing begins. Fencing, salting away from water and meadows, and constructing livestock trails and upland water developments helps to achieve uniform use of forage by livestock. Specific soil and site characteristics should be considered to determine suitable practices. Deferred grazing or noncontinuous grazing allows plants to complete their growth cycle and replenish their reserve of carbohydrates. In areas where proper grazing management alone cannot restore the vegetation to its potential within a reasonable period of time, brush control and range seeding should be considered. Prescribed burning and chemical or mechanical treatment can be used to control infestations of unwanted shrubs, but use of these methods can also increase the risk of erosion. Annual plant competition and low rainfall can result in seeding failure. Seedbeds should be prepared by disking and fallowing one season before seeding. The seedbed should be firm and free of weeds before seeding late in fall. New seedings should not be grazed during the entire first year and the growing season of the next year.

Sound range management based on the information in this soil survey and other rangeland inventories can maintain or improve forage production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs generally provide the most protection however grass barriers may be effective in controlling erosion in field windbreak situations.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect

cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 7 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in the table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery.

Recreation

Prepared by Dal Ames, soil scientist, Natural Resources Conservation Service.

The deep canyons, open deserts, and rolling uplands in this survey area provide year-round outdoor opportunities for hunters, fishermen, water and winter sports enthusiasts, picnickers, hikers, campers, sightseers, and students of photography and nature. Natural features that encourage outdoor use include the canyons of the Snake River and Salmon Falls Creek; the Twin, Shoshone, Pillar, and Auger Waterfalls on the Snake River; the geologic formations of Balanced Rock; the Hagerman Fossil Beds National Monument; the South Hills; and the erosional remnants of the Bonneville Flood as seen at Devils Corral and Dry Cataracts National Natural Landmark.

Urban recreational facilities, such as parks, ballfields, playgrounds, swimming pools, tennis courts, and golf courses are in or around the major population centers.

Wildlife

Prepared by Frank Fink, wildlife biologist, Natural Resources Conservation Service, from data provided by biologists of the Idaho Department of Fish and Game.

This section relates the general soil map units in the survey area to the specific wildlife species and their activities. Wildlife in an area typically is related to the vegetation that is present. Vegetation is closely related to the soil and its capability to produce herbaceous and woody plants.

The survey area supports a variety of fish and wildlife, including mammals, birds, reptiles, and amphibians. Migratory wildlife, many of which are avian species, use the area seasonally. The wide array of fish and wildlife in the area are supported by the variety of habitats present. The mountains, terraces, bottom land, and drainageways and the associated soils, the precipitation, the land uses, and the topography provide diverse habitats.

The dominant vegetation at the higher elevations includes big sagebrush, low sagebrush, Idaho fescue, and bluebunch wheatgrass. Smaller areas of aspen, serviceberry, bitterbrush, and snowberry are scattered throughout the higher elevations.

The vegetation at the intermediate elevations is dominantly big sagebrush, bitterbrush, rabbitbrush, Idaho fescue, and wheatgrasses. Agricultural activities, mainly crop production, occur throughout these areas and add to the diversity of the habitat.

Springs and drainageways, although small in total acreage, are key to wildlife diversity in the survey area. These riparian areas occur as linear ribbons, frequently extending through several general soil map units. Vegetation associated with these areas includes willow, cottonwood, dogwood, alder, aspen, and sedges and other water-tolerant grasses.

Ungulates

Ungulates, dominantly mule deer and antelope, are the largest and most easily recognized animals in the survey area. Small populations of whitetail deer and elk also are present in the area.

Mule deer are throughout the area in habitat ranging from the high mountainous areas to the canyonlands along the Snake River. Mule deer populations are dependent on winter and summer habitat. Areas that support mountain brush plant communities comprised of sagebrush, bitterbrush, rabbitbrush, snowberry, serviceberry, and aspen are used by mule deer in summer. Although mule deer can be seen throughout the survey area, the largest

populations in summer are in the south and south-central parts in areas associated with general soil map units 7, 9, 11, 12, 14, 15, 16, 17, 18, 19, and 20.

Winter habitat for mule deer is characterized by sagebrush and bitterbrush rangeland at the lower elevations and along riparian areas and canyons. The south-central part associated with general soil map units 7, 8, 9, and 11 provides wintering areas for deer. General soil map unit 13, which is associated with the Snake River and Salmon Falls Creek, also provides critical wintering areas.

Mule deer populations are also increasing in the agricultural and rangeland areas associated with general soil map units 2, 6, and 10.

Antelope are throughout the survey area. The largest populations are in the south and south-central parts associated with rangeland and scattered agricultural areas. General soil map units 9, 14, 15, 16, 17, and 18 offer the highest quality habitat. Flat to rolling areas support dominantly grasses and sagebrush. Antelope also roam in the northern parts of the survey area in areas associated with general soil map units, 5, 6, and 10.

Elk are rare in the survey area. During harsh winters, they sometimes migrate into Jerome County from the north in areas associated with general soil map units 2, 5, 6, and 10. Occasionally elk are seen in the extreme southern parts of Twin Falls County in areas associated with general soil map units 12, 15, 16, and 18.

Avians

Common upland game birds in the survey area include pheasants, gray partridge, California quail, and sage grouse. Small populations of turkey and chukar also inhabit the area.

Pheasant and gray partridge are in agricultural areas associated with general soil map units 1, 2, 3, 4, 5, 7, 8, 10, and 11. The woody vegetation in these map units and the riparian areas associated with general soil map unit 13 provide habitat in winter. Pheasant and partridge populations are dependent on the availability of undisturbed nesting cover and adequate woody vegetation in harsh winters. Loss of undisturbed herbaceous plants associated with irregularly shaped areas in the corners of fields and along irrigation canals and ditches have resulted in a low rate of survival in winter.

Sage grouse populations are highest in the south and south-central parts of the survey area. These areas are characterized by a plant community that supports dominantly sagebrush, grasses, and forbs. General soil map units 7, 9, 11, 12, 14, 15, 16, 17, 18, and 20 typically are associated with plant communities suitable for sage grouse. Sage grouse migrate through these areas inhabiting the more open grass and forb plant communities in summer and relying on areas that support dominantly sagebrush during the rest of the year. Because sage grouse rely on areas that support sagebrush and grasses, they are extremely vulnerable to land use management practices.

Wild turkeys have been introduced into the survey area, and they sustain a small resident population in general soil map unit 13. These birds inhabit the Snake River Canyon, in the vicinity of the Niagara Springs Wildlife Management Area. A small population is also in the riparian areas along Big Cottonwood Creek, in the west-central part of the survey area.

California quail inhabit the Snake River corridor from Twin Falls downstream along Salmon Falls Creek and Rock Creek. General soil map unit 13 provides the best habitat for quail. Habitat suitable for quail is in steep canyons and on riparian bottom land and associated agricultural areas.

Chukar populations in the area are small. The largest number is along Salmon Falls Creek in areas associated with general soil map unit 13. The rocky slopes, steep terrain, and adjacent riparian areas provide habitat for chukar. The quality of the habitat is dependent on the condition of the riparian areas and on adequate water supplies.

Many nongame birds are in the survey area. These include kingfishers, woodpeckers, larks, swallows, magpies, crows, chickadees, wrens, thrashers, thrushes, flycatchers, starlings, vireos, warblers, finches, blackbirds, tanagers, and sparrows. The Snake River corridor and the Salmon Falls Creek and Rock Creek areas provide diverse habitat for nongame avian populations. The intermittent and permanent tributary creeks of the Snake River and the riparian areas throughout Jerome and Twin Falls Counties also contribute to the habitat. Poor management of these areas can restrict the growth of diverse plant communities and thus reduce the bird populations. The number of nongame bird species in an area provides an indicator of the environmental health of a region.

Waterfowl

Waterfowl are concentrated along streams, rivers, and reservoirs in the survey area. Waterfowl species include Canada geese, mallard, gadwall, widgeon, teal, goldeneye, canvasback, ringneck, redhead, pintail, and scaup.

The Hagerman and Niagara Springs Wildlife Management Areas along the Snake River provide critical breeding and wintering areas for large numbers of Canada geese and mallards. Waterfowl populations in other areas of Twin Falls and Jerome Counties associated with creeks, canals, wetlands, and reservoirs usually are limited in value because of poor quality nesting and rearing areas.

Trumpeter swans are being introduced into areas from eastern Idaho to the lower reaches of the Snake River. This is an effort by State and Federal agencies to reduce the high mortality rate of the swans by expanding their winter range.

Raptors

Hawks, eagles, and owls are throughout the survey area. The canyons associated with the Snake River, Salmon Falls Creek, and Rock Creek offer many exposed cliffs suitable as nesting areas for a variety of species. The Snake River Canyon also provides winter habitat for bald eagles and rough-legged hawks. Species that use the survey area include golden eagle, bald eagle, prairie falcon, red-tailed hawk, ferruginous hawk, rough-legged hawk, northern harrier, kestrel, burrowing owl, short-eared owl, great horned owl, and a few peregrine falcon.

Furbearers

Furbearers such as otter, beaver, mink, raccoon, and muskrat live in and adjacent to the major streams and creeks in the survey area. General soil map unit 13, which is associated with the Snake River and Salmon Falls Creek, provides the most diverse habitat for these furbearers. Small creeks, canals, and reservoirs throughout the area also provide the diverse habitat needed for small populations of the furbearers.

Coyote, red fox, and badger are throughout the survey. Bobcats and lions have limited range, but they typically are in areas that have not been disturbed by humans. The population of lions, although small, is highest in areas with large populations of mule deer.

Fisheries

Fisheries in the survey area are limited to stream and reservoir habitat. Several reservoirs in the area provide fishing opportunities for local and state residents. Wilson Lake, Cedar Creek, Murtaugh Lake, and Salmon Falls Creek Reservoirs provide the most diverse fish populations in the area. All of these except Murtaugh Lake are stocked with rainbow trout. Salmon Falls Creek Reservoir has the most diverse game fish populations. Species include walleye, rainbow and brown trout, kokanee, small mouth bass, perch, and black crappie.

Stream and creek fisheries are in Snake River, Salmon Falls Creek, Rock Creek, and other tributaries that have a permanent waterflow. Fish species associated with the streams and creeks include rainbow trout and brown trout. Shoshone sculpin, listed by Idaho as a species of special concern, also inhabit springs in the survey area. White sturgeon inhabit the Snake River from Shoshone Falls downstream.

The quality of the stream and creek fisheries is closely tied to the quality of the surrounding riparian areas. Poor management of the riparian areas has lead to poor quality water and habitat. Development in spring has depleted natural spawning areas. Heavy sedimentation and nutrient loads have degraded the fish resource. Some portions of the rivers and creeks do not meet the Idaho designated beneficial use of salmonid spawning and cold water biota.

Threatened and Endangered Species

Two threatened or endangered species, the bald eagle and peregrine falcon, are known to use the survey area at certain times of the year, but they are not known to nest in the area. In winter bald eagles feed in areas associated with lakes, streams, and creeks along the Snake River. Areas of general soil map unit 13 provide most of this winter habitat. Peregrine falcon use areas associated with the canyons of the Snake River and Salmon Falls Creek. These areas have potential as nesting areas for falcon. All general soil map units except the mountainous units provide potential habitat for peregrine falcon.

The fish and wildlife resources in the survey area are largely determined by the suitability of

the habitat, including the supply of food, the amount of cover, and the availability of water. Habitats differ in their capacity to provide these essential ingredients. Some deficiencies are the result of characteristics of the soils and others are the result of management practices. The soils can be managed to improve habitat for fish and wildlife, but the other uses of the soils should be considered when determining proper management practices.

Soils affect the kind and amount of vegetation available as food and cover for fish and wildlife. Soils also affect the construction of water impoundments and other engineering practices. Wildlife habitat can be created or improved by planting appropriate vegetation, maintaining the existing vegetation, or promoting natural establishment of desirable plants.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 8 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are

so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 9 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and

bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 10 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other

standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the

absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 11 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, and irrigation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 12 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(3, 9)* and the system adopted by the American Association of State Highway and Transportation Officials *(2, 9)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on

laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 13 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals

in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, more than 6 percent; and *very high*, greater than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 14 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine

texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table-that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. “More than 6.0” indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Table 15 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a cemented or indurated subsurface layer within a depth of 5 feet. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers.

A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Aridisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Argid (*Arg*, meaning clay, plus *id*, from Aridisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Durargids (*Dur*, meaning presence of a duripan, plus *argid*, the suborder of the Aridisols that have an argillic horizon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Xerollic* identifies the subgroup that typifies the great group. An example is Xerollic Durargids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Xerollic Durargids.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” *(18)*. Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” *(15)* and in “Keys to Soil Taxonomy” *(17)*. Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section “Detailed Soil Map Units.”

Ackett Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Stream terraces
Parent material: Kind—alluvium; source—welded tuff
Slope range: 2 to 25 percent
Elevation: 4,900 to 5,600 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 46 to 49 degrees F
Frost-free period: 90 to 120 days

Taxonomic class: Clayey-skeletal, montmorillonitic, mesic, shallow Xerollic Durargids

Typical Pedon

A1—0 to 1 inch; pale brown (10YR 6/3) extremely gravelly clay loam, brown (10YR 5/3) moist; weak medium platy structure; soft, friable, sticky and plastic; common very fine and fine roots; many very fine and fine vesicular pores; 60 percent gravel and 5 percent cobbles; strongly alkaline; abrupt smooth boundary.

A2—1 inch to 3 inches; light brownish gray (10YR 6/2) clay, grayish brown (10YR 5/2) moist; moderate medium platy structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; many very fine and fine vesicular pores; 5 percent gravel; strongly alkaline; abrupt smooth boundary.

Bt—3 to 6 inches; pale brown (10YR 6/3) clay, brown (10YR 5/3) moist; weak fine prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; 5 percent gravel; moderately alkaline; abrupt wavy boundary.

Btkq—6 to 8 inches; light gray (10YR 7/2) extremely cobbly clay, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; common distinct clay films on faces of peds and in pores, many continuous silica laminations throughout fragments; fractures are 1/4 inch wide and 8 inches apart; few very fine roots in fractures; violently effervescent; 70 percent cobbles and 10 percent gravel; moderately alkaline; abrupt smooth boundary.

2Btk—8 to 14 inches; very pale brown (10YR 7/3) very gravelly clay loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel-sized duripan fragments; violently effervescent (25 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

2Bkqm—14 to 28 inches; white (10YR 8/1) fractured indurated duripan, very pale brown (10YR 7/3) moist; massive; many continuous silica-cemented laminations throughout the duripan; fractures are 1/4 inch wide and 20 inches apart; few very fine roots in fractures of duripan; violently effervescent; abrupt smooth boundary.

3Bkq—28 to 50 inches; multicolored extremely gravelly sand; single grain; loose in places; weakly lime- and silica-cemented with lime pendants on underside of gravel; 80 percent gravel; violently effervescent; moderately alkaline; abrupt smooth boundary.

R—50 inches; dark gray (N 4/0) welded tuff, very dark gray (N 3/0) moist; extremely hard; lime coatings on upper boundary.

Typical Pedon Location

Map unit in which located: Ackett extremely gravelly clay loam, 2 to 10 percent slopes
Location in survey area: About 17 miles southwest of Rogerson, Idaho; in the SE1/4SE1/4NW1/4 of sec. 26, T. 16 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches
Depth to secondary lime—5 to 14 inches
Depth to duripan—10 to 20 inches

A1 horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3
Gravel content—30 to 60 percent
Cobble content—5 to 15 percent
Reaction—mildly alkaline to strongly alkaline

Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4
Texture—clay loam or clay
Gravel content—5 to 15 percent
Clay content—35 to 50 percent
Reaction—mildly alkaline to strongly alkaline

2Btk horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—3 or 4
Texture—very cobbly clay, extremely cobbly clay, very cobbly clay loam, extremely cobbly clay loam, extremely gravelly clay, extremely gravelly clay loam, or very gravelly clay loam
Rock fragment content—40 to 80 percent
Clay content—35 to 55 percent
Calcium carbonate equivalent—20 to 30 percent

2Bkqm horizon:
Value—7 or 8 dry
Chroma—1 to 3
Thickness of duripan—dominantly 8 to 15 inches

Aeric Fluvaquents

Depth class: Very deep
Drainage class: Somewhat poorly drained to very poorly drained
Permeability: Slow or moderate
Position on landscape: Flood plains
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 2 percent
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Aeric Fluvaquents

Example Pedon

Ag1—0 to 4 inches; light brownish gray (10YR 6/3) silty clay loam, very dark grayish brown (10YR 3/2) moist; common medium distinct mottles, yellow (10YR 7/6) dry; moderate coarse platy structure; hard, firm, sticky and plastic; many very fine to medium roots; common fine tubular pores; neutral; clear smooth boundary.
Ag2—4 to 13 inches; light brownish gray (10YR 6/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; common coarse distinct mottles, yellow (10YR 7/6) dry; moderate medium platy structure; hard, firm, sticky and plastic; many very fine to medium roots; common fine tubular pores; neutral; clear smooth boundary.
Ag3—13 to 18 inches; dark gray (10YR 4/1 silty clay, black (10YR 2/1) moist; common fine distinct mottles, dark yellowish brown (10YR 3/6) moist; moderate medium platy structure; many very fine to medium roots; common fine tubular pores; neutral; abrupt smooth boundary.
Cg—18 to 60 inches; pale brown (10YR 6/3) loamy sand, very dark grayish brown (10YR 3/2) moist; common medium distinct mottles, dark yellowish brown (10YR 3/6) moist; single grain; loose; common very fine and fine roots; few fine irregular pores; neutral.

Example Pedon Location

Map unit in which located: Aeric Fluvaquents
Location in survey area: About 14 miles south of Rogerson, Idaho; in the $NE^1/_4SW^1/_4SE^1/_4$ of sec. 7, T. 15 E., R.15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to water table—6 to 36 inches

Particle-size control section:
Clay content—5 to 45 percent

Ag horizon:
Value—4 to 6 dry, 2 or 3 moist
Chroma—1 or 2
Texture—silty clay, silty clay loam, or silt loam

Cg horizon:
Value—5 or 6 dry, 2 or 3 moist
Chroma—1 to 3
Texture—stratified loamy sand to silty clay loam

Amboat Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Summits
Parent material: Kind—colluvium and residuum; source—welded tuff
Slope range: 2 to 20 percent
Elevation: 5,800 to 6,600 feet
Average annual precipitation: 13 to 16 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Typic Palexerolls

Typical Pedon

A—0 to 3 inches; dark brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly

hard, friable, slightly sticky and slightly plastic; many very fine, fine, and coarse roots; many very fine tubular pores; 20 percent gravel; neutral; clear smooth boundary.

AB—3 to 8 inches; dark brown (10YR 4/3) gravelly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine, fine, and coarse roots; many very fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.

Bt1—8 to 17 inches; dark brown (10YR 4/3) gravelly clay, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 30 percent gravel; neutral; abrupt smooth boundary.

2Bt2—17 to 60 inches; brown (7.5YR 4/2) extremely stony clay, dark brown (7.5YR 4/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; common roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 85 percent gray (10YR 5/1) fractured vesicular welded tuff, very dark gray (10YR 3/1) moist; fractures are 1/2 inch to 2 inches wide and run perpendicular to the surface; seams of clay in fractures; neutral.

Typical Pedon Location

Map unit in which located: Brose-Amboat complex, 2 to 20 percent slopes

Location in survey area: About 8 miles south of Rogerson, Idaho; in the NE1/4NW1/4NW1/4 of sec. 29, T. 15 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—12 to 20 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3
Gravel content—10 to 20 percent
Cobble content—0 to 10 percent
Stone content—0 to 5 percent
Reaction—slightly acid or neutral

Bt1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—gravelly clay loam, gravelly silty clay loam, or gravelly clay
Gravel content—15 to 30 percent
Cobble content—0 to 5 percent
Clay content—35 to 55 percent

2Bt2 horizon:
Hue—7.5YR or 10YR
Value—4 or 5 dry, 3 to 5 moist
Chroma—2 to 4
Cobble content—0 to 5 percent
Stone content—60 to 85 percent
Clay content—60 to 85 percent

Aninto Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff
Slope range: 1 to 30 percent
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Typic Palexerolls

Typical Pedon

A—0 to 6 inches; brown (10YR 5/3) very gravelly silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; 40 percent gravel; slightly acid; abrupt smooth boundary.

Bt1—6 to 13 inches; brown (10YR 4/3) very gravelly clay, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 40 percent gravel; slightly acid; clear smooth boundary.

Bt2—13 to 26 inches; brown (10YR 4/3) very

gravelly silty clay, brown (7.5YR 4/4) moist; moderate medium prismatic structure parting to moderate medium angular blocky; very hard, very firm, very sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; many prominent clay films on faces of peds and in pores; 40 percent gravel; slightly acid; gradual wavy boundary.

Bt3—26 to 41 inches; yellowish brown (10YR 5/4) extremely gravelly silty clay, brown (7.5YR 4/4) moist; moderate medium angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 70 percent gravel; neutral; clear smooth boundary.

2Btk—41 to 56 inches; dark yellowish brown (10YR 4/4) clay, brown (10YR 4/3) moist; moderate medium angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; slightly effervescent (10 percent calcium carbonate equivalent); few fine irregularly shaped filaments or threads of carbonates; neutral; abrupt smooth boundary.

2Bk—56 to 70 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; massive; hard, firm, very sticky and very plastic; few very fine and fine roots; few very fine and fine tubular pores; slightly effervescent (11 percent calcium carbonate equivalent); few fine irregularly shaped soft masses of carbonates; mildly alkaline.

Typical Pedon Location

Map unit in which located: Aninto complex, 10 to 30 percent slopes

Location in survey area: About 17 miles southeast of Rogerson, Idaho; in the $NW^1/_4SE^1/_4SE^1/_4$ of sec. 25, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—10 to 15 inches

Particle-size control section:
Clay content—50 to 59 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—very gravelly clay, very gravelly silty clay, extremely gravelly silty clay, or extremely gravelly clay
Gravel content—40 to 75 percent

Antelope Springs Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Alluvial fans and terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 4 percent
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Natrargids

Typical Pedon

A—0 to 4 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common fine vesicular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

Btkn—4 to 13 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; strongly effervescent; strongly alkaline; clear smooth boundary.

C1—13 to 25 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; strongly effervescent; lime segregated in filaments; very strongly alkaline; gradual wavy boundary.

C2—25 to 60 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; strongly effervescent; lime segregated in filaments; very strongly alkaline.

Typical Pedon Location

Map unit in which located: Antelope Springs loam, 0 to 4 percent slopes
Location in survey area: About 4 miles southeast of Hollister, Idaho; in the NE$^{1}/_{4}$NE$^{1}/_{4}$NE$^{1}/_{4}$ of sec. 12, T. 13 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches

A horizon:
Value—6 or 7 dry, 3 to 5 moist
Chroma—2 or 3
Reaction—moderately alkaline or strongly alkaline

Btkn horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3
Texture—loam or clay loam
Clay content—24 to 34 percent
Reaction—moderately alkaline or strongly alkaline

C horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—3 or 4
Clay content—20 to 25 percent

Arbidge Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff and volcanic ash
Slope range: 1 to 4 percent
Elevation: 4,400 to 5,500 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 120 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Durargids

Typical Pedon

A—0 to 4 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable; many roots; many very fine irregular pores; neutral; abrupt smooth boundary.
Bt1—4 to 8 inches; yellowish brown (10YR 5/4) sandy clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; mildly alkaline; gradual wavy boundary.
Bt2—8 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.
Bk—15 to 26 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; very hard, firm; few very fine and fine roots; few fine tubular pores; 5 percent durinodes $^{1}/_{2}$ to 1 inch in diameter; strongly effervescent (13 percent calcium carbonate equivalent); few fine lime filaments; moderately alkaline; clear smooth boundary.
Bkqm—26 to 40 inches; very pale brown (10YR 7/3) duripan, brown (10YR 5/3) moist; massive; extremely hard; thin ($^{1}/_{16}$ to $^{1}/_{8}$ inch thick) continuous laminar cap; subsequent continuous silica-cemented laminations every 3 to 8 inches; strongly effervescent cemented sandy loam matrix between laminations; few very fine roots to fractures; clear wavy boundary.
3C—40 to 65 inches; multicolored extremely gravelly sand; few very fine roots; lime and silica coatings on underside of gravel; 80 percent gravel.

Typical Pedon Location

Map unit in which located: Arbidge sandy loam, 1 to 4 percent slopes
Location in survey area: About 5 miles southwest of Rogerson, Idaho; in the NW$^{1}/_{4}$NW$^{1}/_{4}$SW$^{1}/_{4}$ of sec. 26, T. 14 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—10 to 25 inches
Depth to duripan—20 to 40 inches
Depth to extremely gravelly sand—22 to 40 inches or more

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Gravel content—0 to 15 percent

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—sandy clay loam, clay loam, or loam
Gravel content—0 to 10 percent
Clay content—20 to 30 percent

Bk horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—sandy loam, sandy clay loam, or gravelly sandy loam
Gravel content—0 to 20 percent
Effervescence—strong or violent
Reaction—mildly alkaline or moderately alkaline

Bkqm horizon:
Thickness of upper silica lamination—1/16 to 1/8 inch
Thickness of lower silica laminations—1/16 to 1 inch
Laminar cap—continuous or intermittent

Arness Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—ignimbrite, welded tuff, and volcanic ash
Slope range: 2 to 6 percent
Elevation: 5,100 to 5,900 feet
Average annual precipitation: 11 to 13 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Loamy, mixed, frigid, shallow Aridic Durixerolls

Typical Pedon

A—0 to 2 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many very fine irregular pores; neutral; clear smooth boundary.

AB—2 to 6 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine irregular pores; neutral; gradual wavy boundary.

Bt1—6 to 12 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common roots; many very fine irregular pores; few faint clay films on faces of peds and in pores; neutral; clear smooth boundary.

Bt2—12 to 19 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; strong medium angular blocky structure; very hard, firm, sticky and plastic; common very fine to medium roots; common very fine irregular pores; common distinct clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.

Bkqm—19 to 32 inches; white (10YR 8/1) fractured duripan, very pale brown (10YR 7/3) moist; platy; indurated; extremely hard, extremely firm; many 1/16- to 1/4-inch-thick lime-and silica-cemented lenses mixed with ignimbrite sand and gravel; few very fine and fine roots in fractures of duripan; fractures are 1/4 inch wide and 8 inches apart; strongly effervescent; moderately alkaline; abrupt wavy boundary.

R—32 inches; black (10YR 2/1) ignimbrite, black (7.5YR 2/0) moist.

Typical Pedon Location

Map unit in which located: Arness sandy loam, 2 to 6 percent slopes
Location in survey area: About 16 miles west of Rogerson, Idaho; in the NW1/4NE1/4SE1/4 of sec. 23, T. 14 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Depth to duripan—14 to 20 inches
Thickness of mollic epipedon—7 to 12 inches

Particle-size control section:
Clay content—22 to 34 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—0 to 10 percent

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—sandy clay loam or gravelly sandy clay loam
Gravel content—0 to 20 percent
Reaction—neutral or mildly alkaline

Bkqm horizon:
Thickness of upper silica lamination—1/16 to 1/2 inch
Thickness of lower silica laminations—2 inches or less
Cementation between laminations—weak to strong
Thickness of duripan—3 to 15 inches

Bahem Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—loess and alluvium; source—mixed
Slope range: 1 to 12 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Calciorthids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium platy structure; soft, friable; many very fine and fine roots; many very fine and fine tubular pores; strongly effervescent (9 percent calcium carbonate equivalent); mildly alkaline; clear smooth boundary.
BA—3 to 9 inches; pale brown (10YR 6/3) silt loam, grayish brown (10YR 5/2) moist; weak medium subangular block structure; slightly hard, friable; many very fine and fine roots; many very fine and fine tubular pores; strongly effervescent (8 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk1—9 to 22 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, firm; few very fine and fine roots; many very fine and fine tubular pores; strongly effervescent (18 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk2—22 to 40 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable; few very fine and fine roots; common fine tubular pores; strongly effervescent (15 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk3—40 to 53 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; massive; very hard, friable; few very fine roots; common fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk4—53 to 70 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable; common fine tubular pores; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Bahem silt loam, 4 to 8 percent slopes
Location in survey area: About 21 miles northwest of Buhl, Idaho; in the SW1/4NE1/4SE1/4 of sec. 29, T. 6 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—8 to 10 inches

Particle-size control section:
Clay content—10 to 18 percent

A horizon:
Chroma—2 or 3

Reaction—mildly alkaline or moderately alkaline

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3
Texture—silt loam or very fine sandy loam
Calcium carbonate equivalent—10 to 30 percent
Durinode content—0 to 10 percent

Banbury Series

Depth class: Shallow to basalt
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium and residuum; source—basalt
Slope range: 2 to 20 percent
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy, mixed, mesic Lithic Xerollic Haplargids

Typical Pedon

A1—0 to 3 inches; dark grayish brown (10YR 4/2) loam, dark brown (10YR 3/3) moist; weak thick platy structure parting to weak medium to fine granular; soft, very friable; many fine and very fine roots; common very fine irregular pores; mildly alkaline; abrupt smooth boundary.

A2—3 to 5 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium to fine granular structure; soft, very friable, slightly sticky; common fine and very fine roots; few very fine tubular pores and common very fine irregular pores; mildly alkaline; abrupt smooth boundary.

BA—5 to 10 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to weak medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine tubular pores; mildly alkaline; abrupt smooth boundary.

Bt1—10 to 14 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure parting to weak medium to coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few fine tubular pores; few faint clay films in pores; mildly alkaline; abrupt smooth boundary.

Bt2—14 to 17 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 3/4) moist; weak medium to coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; few fine tubular pores; few faint clay films in pores; mildly alkaline; abrupt wavy boundary.

R1—17 to 19 inches; fractured basalt; coatings of lime on underside of fragments.

R2—19 inches; basalt.

Typical Pedon Location

Map unit in which located: Banbury loam, 2 to 12 percent slopes
Location in survey area: About 2 miles north of Buhl, Idaho; in the $SW^1/_4SW^1/_4NW^1/_4$ of sec. 24, T. 9 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—10 to 20 inches
Reaction—mildly alkaline or moderately alkaline

A1 horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—2 or 3

Bt horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—loam, clay loam, or gravelly loam
Gravel content—0 to 20 percent
Clay content—25 to 33 percent

Bancy Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff and volcanic ash
Slope range: 2 to 12 percent
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Clayey, montmorillonitic, frigid, shallow Typic Durixerolls

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine to fine roots; many fine vesicular pores; 25 percent gravel; neutral; abrupt smooth boundary.

Bt1—3 to 8 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; neutral; abrupt wavy boundary.

Bt2—8 to 17 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 3/4) moist; moderate medium angular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; neutral; abrupt wavy boundary.

Bkqm—17 to 31 inches; white (10YR 8/1) duripan, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent; abrupt wavy boundary.

2R—31 inches; fractured welded tuff.

Typical Pedon Location

Map unit in which located: Bancy-Tanner complex, 2 to 12 percent slopes

Location in survey area: About 15 miles southeast of Rogerson, Idaho; in the NW$^1/_4$SE$^1/_4$SE$^1/_4$ of sec. 21, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—22 to 40 inches
Depth to duripan—14 to 20 inches
Thickness of mollic epipedon—7 to 12 inches

Particle-size control section:
Clay content—40 to 50 percent

A horizon:
Value—4 or 5 dry
Chroma—2 or 3
Gravel content—15 to 25 percent
Cobble content—0 to 5 percent

Bt horizon:
Value—4 to 6
Chroma—3 or 4
Gravel content—0 to 10 percent
Cobble content—0 to 5 percent

Btkq horizon (where present):
Rock fragment content—5 to 35 percent

Bkqm horizon:
Thickness of upper silica lamination—3 to 6 inches
Thickness of lower silica laminations—2 to 4 inches
Thickness of duripan—10 to 20 inches

Barrymore Series

Depth class: Moderately deep to basalt
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium and loess; source—mixed
Slope range: 1 to 4 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 5 inches; yellowish brown (10YR 5/4) silt loam, dark yellowish brown (10YR 4/4) moist; moderate medium platy structure; soft, friable; common very fine and fine roots; many very fine and fine irregular pores; neutral; clear smooth boundary.

Bw—5 to 17 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable; few fine and very fine roots; common very fine and few fine tubular pores; neutral; clear smooth boundary.

Bk—17 to 25 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, friable; few very fine roots; common very fine tubular pores; 5 percent gravel; strongly effervescent (25 percent calcium

carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2R—25 inches; fractured basalt; lime coatings on surface and in fractures.

Typical Pedon Location

Map unit in which located: Barrymore-Starbuck complex, 1 to 4 percent slopes
Location in survey area: About 7 miles north of Jerome, Idaho; in the NE¼NE¼NW¼ of sec. 6, T. 7 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Depth to secondary lime—15 to 20 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4

Bw horizon:
Value—5 or 6 dry
Chroma—3 or 4
Clay content—14 to 20 percent

Bk horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 or 3
Clay content—8 to 18 percent
Gravel content—0 to 10 percent
Calcium carbonate equivalent—15 to 30 percent

Blacknest Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 1 to 15 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 5 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; 10 percent gravel; neutral; clear smooth boundary.
Bt1—5 to 13 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; neutral; gradual wavy boundary.
Bt2—13 to 24 inches; pale brown (10YR 6/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 15 percent gravel; neutral; gradual wavy boundary.
2Bw—24 to 30 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable; few fine and very fine roots; few fine and very fine tubular pores; 20 percent gravel; mildly alkaline; gradual wavy boundary.
2Bk—30 to 60 inches; multicolored extremely gravelly sand; single grain; loose; weak lime and silica cementation with carbonates and silica coatings on underside of gravel; strongly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Rakane-Blacknest complex, 1 to 4 percent slopes
Location in survey area: About 14 miles northwest of Buhl, Idaho; in the NW¼NW¼SE¼ of sec. 18, T. 8 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—20 to 40 inches
Depth to extremely gravelly sand—20 to 40 inches

Particle-size control section:
Rock fragment content—5 to 30 percent
Clay content—18 to 30 percent

A horizon:
Value—3 or 4 moist
Chroma—2 or 3

Gravel content—0 to 10 percent

Bt horizon:
Chroma—3 or 4
Texture—loam, sandy clay loam, clay loam, gravelly loam, gravelly sandy clay loam, or gravelly clay loam

Bluegulch Series

Depth class: Deep to welded tuff
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Ridges and dip slopes
Parent material: Kind—colluvium; source—welded tuff
Slope range: 2 to 30 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine tubular pores; 25 percent gravel; neutral; clear smooth boundary.
Bw1—4 to 12 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine tubular pores; 15 percent gravel; neutral; gradual wavy boundary.
Bw2—12 to 20 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and few medium roots; common very fine and fine tubular pores; 45 percent gravel and 5 percent cobbles; mildly alkaline; clear smooth boundary.
Bk—20 to 44 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable; few very fine and fine roots; few very fine and fine irregular pores; 45 percent gravel and 25 percent cobbles; strongly effervescent; carbonates and silica coatings on underside of coarse fragments; mildly alkaline; abrupt wavy boundary.
R—44 inches; welded tuff.

Typical Pedon Location

Map unit in which located: Bluegulch gravelly loam, 2 to 12 percent slopes
Location in survey area: About 12 miles southwest of Buhl, Idaho; in the $SW^1/_4NW^1/_4NW^1/_4$ of sec. 12, T. 10 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches
Depth to secondary lime—18 to 35 inches
Rock fragment content—50 to 70 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Gravel content—15 to 30 percent

Bw horizon:
Value—3 or 4 moist
Gravel content—15 to 45 percent
Cobble content—0 to 5 percent
Clay content—18 to 26 percent

Bk horizon:
Value—4 or 5 moist
Chroma—2 or 3
Texture—extremely gravelly sandy loam or extremely gravelly loam
Gravel content—45 to 55 percent
Cobble content—10 to 25 percent

Brose Series

Depth class: Shallow to welded tuff
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Summits
Parent material: Kind—colluvium and residuum; source—welded tuff
Slope range: 2 to 20 percent
Elevation: 5,800 to 6,600 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic class: Clayey, montmorillonitic, frigid Lithic Ultic Argixerolls

Typical Pedon

A1—0 to 1 inch; brown (10YR 5/3) extremely cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 30 percent gravel, 30 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

A2—1 inch to 3 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/1) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 20 percent gravel; neutral; clear smooth boundary.

Bt1—3 to 9 inches; brown (10YR 5/3) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; 20 percent gravel; neutral; clear smooth boundary.

Bt2—9 to 11 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 20 percent gravel; neutral; abrupt smooth boundary.

2Bt3—11 to 18 inches; reddish brown (5YR 5/3) gravelly clay, reddish brown (5YR 4/3) moist; moderate medium prismatic structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 30 percent gravel; neutral; abrupt smooth boundary.

2R—18 inches; dark gray (10YR 4/1) welded tuff, black (10YR 2/1) moist; extremely hard; silica coatings on rock faces in places.

Typical Pedon Location

Map unit in which located: Brose-Amboat complex, 2 to 20 percent slopes (fig. 11)

Location in survey area: About 8 miles south of Rogerson, Idaho; in the NE$^1/_4$NW$^1/_4$NW$^1/_4$ of sec. 29, T. 15 S., R. 16 E.

Figure 11.—Profile of Brose extremely cobbly loam in an area of Brose-Amboat complex, 2 to 20 percent slopes.

Range in Characteristics

Profile:
Depth to bedrock—10 to 20 inches
Thickness of mollic epipedon—10 to 18 inches

Particle-size control section:
Clay content—40 to 60 percent
Base saturation—60 to 70 percent
Reaction—slightly acid or neutral

A1 horizon:
Value—2 or 3 moist
Chroma—1 to 3

Bt1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—gravelly loam or gravelly clay loam
Gravel content—15 to 30 percent
Cobble content—0 to 5 percent
Clay content—25 to 40 percent

Bt2 and 2Bt3 horizons:
Hue—5YR to 10YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 to 4
Gravel content—15 to 30 percent
Cobble content—0 to 5 percent
Clay content—50 to 70 percent

Budlewis Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium and residuum; source—mixed and basalt
Slope range: 2 to 6 percent
Elevation: 5,300 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Fine, montmorillonitic, frigid Typic Durixerolls

Typical Pedon

A—0 to 4 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt1—4 to 11 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; common very fine to medium roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; neutral; clear smooth boundary.

Bt2—11 to 19 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; strong medium prismatic structure; very hard, very firm, very sticky and very plastic; few very fine to medium roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 5 percent gravel; neutral; clear smooth boundary.

Btk—19 to 27 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common faint clay films on faces of peds and in pores; 5 percent gravel; strongly effervescent (16 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.

Bk—27 to 31 inches; very pale brown (10YR 8/4) silty clay loam, light yellowish brown (10YR 6/4) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; 5 percent gravel and 5 percent cobbles; violently effervescent (30 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bkqm—31 to 36 inches; white (10YR 8/1) fractured duripan, very pale brown (10YR 7/3) moist; platy; indurated; extremely hard, extremely firm; many 1/8- to 1/4-inch-thick lime- and silica-cemented lenses mixed with basalt gravel and cobbles; few very fine and fine roots in fractures of duripan; fractures 1/4 inch wide and 10 inches apart; strongly effervescent; moderately alkaline; abrupt smooth boundary.

2R—36 inches; dark gray (10YR 4/1) basalt, black (10YR 2/1) moist; lime coating, violently effervescent.

Typical Pedon Location

Map unit in which located: Budlewis-Tanner complex, 2 to 6 percent slopes
Location in survey area: About 20 miles southwest of Rogerson, Idaho; in the SE1/4NE1/4SE1/4 of sec. 24, T. 14 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—21 to 40 inches
Depth to duripan—20 to 39 inches
Thickness of mollic epipedon—10 to 14 inches

Particle-size control section:
Clay content—40 to 50 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt horizon:
Hue—10YR or 7.5YR
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4
Texture—silty clay loam, clay, or silty clay
Clay content—37 to 55 percent
Gravel content—0 to 5 percent
Cobble content—0 to 5 percent
Reaction—neutral or mildly alkaline

Btk and Bk horizons:
Value—7 or 8 dry, 5 or 6 moist
Texture—silty clay loam, clay loam, or gravelly loam

Clay content—24 to 35 percent
Gravel content—0 to 20 percent
Cobble content—0 to 5 percent
Reaction—mildly alkaline to strongly alkaline

Bkqm horizon:
Thickness of upper silica lamination—1/16 to 1 inch
Thickness of lower silica laminations—1/2 inch to 3 inches
Cementation between laminations—weak to very strong

Chayson Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff, volcanic ash, and flow rock
Slope range: 2 to 6 percent
Elevation: 5,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Fine-loamy, mixed, frigid Typic Durixerolls

Typical Pedon

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common roots; many very fine and fine tubular pores; 10 percent gravel; mildly alkaline; clear smooth boundary.
Bt1—4 to 11 inches; grayish brown (10YR 5/2) clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.
Bt2—11 to 22 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.
Bk—22 to 29 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; 20 percent gravel-sized duripan fragments; violently effervescent; strongly alkaline; abrupt wavy boundary.
Bkqm—29 to 60 inches; white (10YR 8/2) fractured duripan, light gray (10YR 7/2) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; intermittent layers of noncemented material at intervals of 8 to 24 inches; few very fine roots in fractures of duripan; fractures 1/4 inch wide and 14 inches apart; violently effervescent.

Typical Pedon Location

Map unit in which located: Budlewis-Chayson complex, 2 to 6 percent slopes
Location in survey area: About 23 miles southwest of Rogerson, Idaho; in the SE1/4NW1/4SE1/4 of sec. 3, T. 15 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—45 to 60 inches or more
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—10 to 17 inches

Particle-size control section:
Clay content—24 to 34 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—0 to 10 percent

Bt horizon:
Value—5 or 6 dry, 2 to 4 moist
Chroma—2 to 4
Texture—loam, clay loam, or gravelly loam
Gravel content—0 to 10 percent
Cobble content—0 to 5 percent

Bk horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—3 or 4
Texture—gravelly loam, gravelly clay loam, or clay loam
Gravel content—0 to 20 percent
Cobble content—0 to 5 percent
Effervescence—strong or violent
Reaction—moderately alkaline or strongly alkaline

Bkqm horizon:
Value—7 or 8 dry, 6 or 7 moist
Chroma—2 to 4
Thickness of duripan—12 to 24 inches

Chiara Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 3,600 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 130 days

Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durorthids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable; many very fine, fine, and medium roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bw—3 to 9 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; many very fine, fine, and medium roots; many very fine and fine tubular pores; 5 percent durinodes; mildly alkaline; clear smooth boundary.
Bkq—9 to 17 inches; white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; hard, firm; common very fine and fine roots; common very fine and fine tubular pores; 20 percent durinodes; 5 percent gravel-sized duripan fragments; strongly effervescent (19 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
Bkqm—17 to 49 inches; white (10YR 8/2) fractured indurated duripan, pale brown (10YR 6/3) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent.

Typical Pedon Location

Map unit in which located: Chiara silt loam, 1 to 8 percent slopes
Location in survey area: About 8 miles south of Twin Falls, Idaho; in the $SE^1/_4SE^1/_4SW^1/_4$ of sec. 31, T. 11 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—7 to 12 inches
Depth to duripan—10 to 20 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist

Bw horizon:
Chroma—3 or 4

Bkq horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—2 to 4
Gravel content—0 to 5 percent
Durinode content—20 to 40 percent

Chuska Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Ridges, terraces, and dip slopes
Parent material: Kind—alluvium; source—welded tuff
Slope range: 1 to 12 percent
Elevation: 3,500 to 5,700 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 51 degrees F
Frost-free period: 100 to 140 days

Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 4/3) moist; weak medium platy structure; soft, friable, slightly sticky and slightly plastic; common roots; many very fine and fine vesicular pores; 25 percent gravel; moderately alkaline; abrupt smooth boundary.
Bt1—3 to 7 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine to medium roots; many very fine and fine tubular pores; common distinct clay films on

faces of peds and in pores; 10 percent gravel; moderately alkaline; abrupt smooth boundary.

Bt2—7 to 10 inches; pale brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 10 percent gravel-sized duripan fragments; moderately alkaline; abrupt smooth boundary.

Btk—10 to 14 inches; very pale brown (10YR 7/4) gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; 25 percent gravel-sized duripan fragments; violently effervescent (20 percent calcium carbonate equivalent); strongly alkaline; abrupt smooth boundary.

Bkqm—14 to 18 inches; white (10YR 8/2) fractured indurated duripan, light yellowish brown (10YR 6/4) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; few very fine roots in fractures of duripan; fractures 1/4 inch wide and 10 inches apart; violently effervescent; abrupt smooth boundary.

2Bkq—18 to 29 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, light yellowish brown (10YR 6/4) moist; massive; very hard, very firm; few very fine and fine roots; few very fine and fine tubular pores; 50 percent gravel and 20 percent gravel-sized duripan fragments; coatings of lime on gravel and pendants of lime on underside of gravel; weakly cemented matrix; violently effervescent (25 percent calcium carbonate equivalent); strongly alkaline; abrupt wavy boundary.

2Bk—29 to 51 inches; very pale brown (10YR 7/4) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable; few very fine roots; few very fine tubular pores; 60 percent gravel and 15 percent cobbles; coatings of lime on rock fragments and pendants of lime on undersides of rock fragments; violently effervescent (25 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

3R—51 inches; light yellowish brown (10YR 6/4) welded tuff, yellowish brown (10YR 5/4) moist; extremely hard; coating of lime on upper boundary.

Typical Pedon Location

Map unit in which located: Chuska gravelly loam, 2 to 12 percent slopes

Location in survey area: About 8 miles south of Rogerson, Idaho; in the SW1/4SE1/4SW1/4 of sec. 10, T. 15 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches or more
Depth to duripan—12 to 20 inches

Particle-size control section:
Clay content—26 to 34 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—clay loam, loam, gravelly clay loam, or gravelly loam
Gravel content—5 to 25 percent
Effervescence—slight to strong

Bkqm horizon:
Thickness of upper silica lamination—1 inch to 3 inches
Thickness of lower silica laminations—1/2 inch to 2 inches

Colthorp Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 15 percent
Elevation: 4,200 to 4,700 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 110 to 120 days

Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) cobbly silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable; many very fine, fine, and medium roots; many very fine and fine tubular pores; 10 percent gravel and 10 percent cobbles; neutral; clear smooth boundary.

Bt—3 to 8 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; few faint clay films on faces of peds and in pores; 10 percent gravel; neutral; clear smooth boundary.

Btk—8 to 11 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; few faint clay films on faces of peds and in pores; 10 percent gravel; slightly effervescent in places; mildly alkaline; clear smooth boundary.

Bkq—11 to 18 inches; very pale brown (10YR 8/3) gravelly silt loam, light yellowish brown (10YR 6/4) moist; weak medium subangular blocky structure; very hard, firm; common very fine and fine roots; common fine and very fine tubular pores; 10 percent durinodes; 25 percent gravel-sized duripan fragments; strongly effervescent (18 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bkqm—18 to 24 inches; white (10YR 8/2) indurated duripan, light yellowish brown (10YR 6/4) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent; abrupt wavy boundary.

2R—24 inches; basalt.

Typical Pedon Location

Map unit in which located: Colthorp cobbly silt loam, 1 to 4 percent slopes

Location in survey area: About 1 mile south of Hollister, Idaho; in the $SE^1/_4NW^1/_4NW^1/_4$ of sec. 34, T. 12 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Depth to secondary lime—5 to 14 inches
Depth to duripan—10 to 20 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4
Texture—silt loam or silty clay loam
Clay content—20 to 30 percent
Gravel content—0 to 10 percent
Cobble content—0 to 5 percent

Bkq horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—gravelly silt loam, gravelly loam, or silt loam
Gravel content—0 to 30 percent

Congle Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Foot slopes and back slopes
Parent material: Kind—colluvium; source—welded tuff and volcanic ash
Slope range: 8 to 30 percent
Elevation: 4,800 to 6,400 feet
Average annual precipitation: 13 to 20 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 100 days

Taxonomic class: Fine-loamy, mixed, frigid Pachic Ultic Haploxerolls

Typical Pedon

A—0 to 4 inches; dark brown (10YR 4/3) gravelly loam, black (10YR 2/1) moist; weak fine platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.

Bw1—4 to 11 inches; dark brown (10YR 3/3) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky

structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.

Bw2—11 to 42 inches; dark brown (10YR 3/3) gravelly clay loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; 15 percent gravel; neutral; abrupt smooth boundary.

Bw3—42 to 62 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; very few fine and fine roots; common very fine tubular pores; 25 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Congle gravelly loam, 8 to 30 percent slopes

Location in survey area: About 12 miles east of Hollister, Idaho; in the $SW^1/_4SW^1/_4NE^1/_4$ of sec. 34, T. 12 S., R. 18 E.

Range in Characteristics

Profile:

Depth to welded tuff or volcanic ash—more than 60 inches

Thickness of mollic epipedon—20 to 42 inches

Rock fragment content—5 to 30 percent

Base saturation—60 to 70 percent in upper 30 inches

Reaction—neutral or slightly acid

Particle-size control section:

Clay content—28 to 35 percent

A horizon:

Value—3 or 4 dry, 2 or 3 moist

Chroma—1 to 3

Bw horizon:

Value—3 to 6 dry, 2 or 3 moist

Chroma—1 to 4

Texture—clay loam, gravelly clay loam, gravelly loam, or gravelly silty clay loam

Dehana Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Position on landscape: Hill slopes and breaks

Parent material: Kind—colluvium; source—welded tuff and volcanic ash

Slope range: 4 to 75 percent

Elevation: 5,800 to 7,600 feet

Average annual precipitation: 20 to 25 inches

Average annual air temperature: 40 to 42 degrees F

Frost-free period: 20 to 60 days

Taxonomic class: Fine-loamy, mixed Argic Pachic Cryoborolls

Typical Pedon

A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; 25 percent gravel; moderately acid; clear smooth boundary.

Bt1—6 to 15 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many fine and very fine tubular pores; common faint clay films on faces of peds and in pores; 25 percent gravel; slightly acid; gradual wavy boundary.

Bt2—15 to 30 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common roots; many fine and very fine tubular pores; common faint clay films on faces of peds and in pores; 25 percent gravel; moderately acid; clear smooth boundary.

Bt3—30 to 65 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 20 percent gravel; moderately acid; abrupt smooth boundary.

2C—65 to 70 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 4/6) moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; moderately acid.

Typical Pedon Location

Map unit in which located: Dehana-Rock outcrop complex, 4 to 40 percent slopes
Location in survey area: About 22 miles southwest of Rogerson, Idaho; in the SW¼NE¼NE¼ of sec. 16, T. 16 S., R. 13 E.

Range in Characteristics

Profile:
Depth to welded tuff or volcanic ash—more than 60 inches
Thickness of mollic epipedon—35 to 65 inches

Particle-size control section:
Rock fragment content—20 to 35 percent
Clay content—20 to 30 percent
Base saturation—60 to 70 percent

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2
Gravel content—15 to 30 percent
Reaction—slightly acid or moderately acid

Bt1 and Bt2 horizons:
Value—3 to 5 dry, 2 to 4 moist
Chroma—1 to 3
Texture—gravelly loam or gravelly clay loam
Gravel content—20 to 25 percent
Cobble content—0 to 10 percent
Reaction—slightly acid or moderately acid

Bt3 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—gravelly clay loam or cobbly loam
Gravel content—15 to 20 percent
Cobble content—0 to 15 percent

Dolman Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 1 to 4 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Durorthids

Typical Pedon

A—0 to 4 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; soft, friable; many very fine and fine roots; common very fine and fine tubular pores; neutral; gradual wavy boundary.
BA—4 to 14 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common fine tubular pores; neutral; gradual wavy boundary.
Bw—14 to 21 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine tubular pores; slightly effervescent (8 percent calcium carbonate equivalent); mildly alkaline; clear smooth boundary.
2Bkq—21 to 27 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; massive; very hard, firm, slightly sticky and slightly plastic; few very fine roots; few fine tubular pores; 10 percent durinodes; 10 percent gravel-sized duripan fragments; strongly effervescent (34 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
2Bkqm—27 to 45 inches; fractured duripan; ¼- to 3-inch-thick silica lenses throughout; extremely hard, platy, rocklike material; gradual wavy boundary.
3Bk—45 to 61 inches; multicolored sand and gravel; single grain; loose, very friable; strongly effervescent (8 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Dolman silt loam, 1 to 4 percent slopes
Location in survey area: About 17 miles northwest of Buhl, Idaho; in the SW¼SE¼SE¼ of sec. 35, T. 7 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—14 to 24 inches
Depth to duripan—20 to 40 inches

Particle-size control section:

Gravel content—0 to 10 percent
Clay content—12 to 17 percent

A horizon:
Value—5 or 6 dry
Chroma—2 or 3
Gravel content—0 to 10 percent

Bw horizon:
Value—3 or 4 moist
Gravel content—0 to 5 percent
Clay content—16 to 24 percent
Calcium carbonate equivalent—0 to 5 percent

2Bkq horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—very fine sandy loam, loam, or silt loam
Calcium carbonate equivalent—15 to 35 percent

Doodlelink Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Breaks
Parent material: Kind—colluvium; source—welded tuff and volcanic ash
Slope range: 8 to 75 percent
Elevation: 4,800 to 6,400 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 80 to 100 days

Taxonomic class: Loamy-skeletal, mixed, frigid Pachic Ultic Haploxerolls

Typical Pedon

A—0 to 6 inches; dark grayish brown (10YR 4/2) very gravelly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 50 percent gravel; neutral; gradual wavy boundary.
Bw1—6 to 12 inches; dark brown (10YR 4/3) very gravelly loam, black (10YR 2/1) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 50 percent gravel; neutral; clear smooth boundary.
Bw2—12 to 21 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 50 percent gravel; neutral; clear smooth boundary.
Bw3—21 to 36 inches; yellowish brown (10YR 5/4) extremely gravelly clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine roots; many very fine and fine tubular pores; 70 percent gravel; neutral; gradual wavy boundary.
C—36 to 65 inches; brown (10YR 5/3) extremely gravelly clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; 70 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Doodlelink very gravelly loam, 30 to 75 percent slopes
Location in survey area: About 14 miles east of Rogerson, Idaho; in the $SE^1/_4SE^1/_4SE^1/_4$ of sec. 36, T. 12 S., R. 18 E.

Range in Characteristics

Profile:
Depth to welded tuff or volcanic ash—more than 60 inches
Thickness of mollic epipedon—20 to 30 inches
Rock fragment content—40 to 80 percent
Base saturation—55 to 65 percent in upper 30 inches

Particle-size control section:
Clay content—20 to 30 percent

A and Bw1 horizons:
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 to 3

Bw2 and Bw3 horizons:
Value—4 to 6 dry, 3 or 4 moist
Chroma—1 to 3
Texture—very gravelly sandy loam, extremely gravelly loam, or extremely gravelly clay loam

Eep Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Breaks and hill slopes

Parent material: Kind—colluvium; source—volcanic ash and welded tuff
Slope range: 6 to 75 percent
Elevation: 5,800 to 6,800 feet
Average annual precipitation: 16 to 22 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 60 to 100 days

Taxonomic class: Ashy-skeletal, frigid Vitrandic Argixerolls

Typical Pedon

A—0 to 9 inches; dark grayish brown (10YR 4/2) very cobbly sandy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, friable; many roots; many very fine tubular pores; 20 percent gravel, 30 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
Bt1—9 to 17 inches; brown (10YR 5/3) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.
Bt2—17 to 26 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; few faint clay films on faces of peds and in pores; 40 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
BC—26 to 38 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable; common very fine to medium roots; many very fine tubular pores; 30 percent gravel and 20 percent cobbles; neutral; clear wavy boundary.
C—38 to 76 inches; white (10YR 8/1) unconsolidated loamy sand volcanic ash, light gray (10YR 7/2) moist; single grain; loose; few very fine roots; abrupt wavy boundary.
Cr—76 to 78 inches; very pale brown (10YR 7/3) consolidated volcanic ash, light yellowish brown (10YR 6/4) moist; massive; very hard, very firm.

Typical Pedon Location

Map unit in which located: Eep very cobbly sandy loam, 6 to 35 percent slopes
Location in survey area: About 21 miles southwest of Rogerson, Idaho; in the $NE^1/_4SE^1/_4SE^1/_4$ of sec. 7, T. 15 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—10 to 20 inches
Rock fragment content—40 to 70 percent
Base saturation—65 to 75 percent in upper 40 inches

Particle-size control section:
Clay content—20 to 30 percent

A horizon:
Chroma—1 or 2
Reaction—slightly acid or neutral
Volcanic glass content—75 to 85 percent

Bt horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—very gravelly clay loam, very cobbly loam, or very gravelly loam
Gravel content—25 to 40 percent
Cobble content—10 to 20 percent
Stone content—0 to 10 percent
Volcanic glass content—65 to 85 percent
Reaction—slightly acid or neutral

BC horizon:
Value—5 to 8 dry, 3 to 7 moist
Chroma—1 to 4
Texture—very cobbly sandy loam, very gravelly sandy loam, or extremely gravelly sandy loam
Gravel content—30 to 60 percent
Cobble content—10 to 30 percent
Volcanic glass content—85 to 95 percent

Elhina Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff
Slope range: 2 to 6 percent
Elevation: 5,200 to 5,800 feet
Average annual precipitation: 9 to 11 inches

Average annual air temperature: 43 to 45 degrees F
Frost-free period: 85 to 95 days

Taxonomic class: Fine, montmorillonitic, frigid Abruptic Xerollic Durargids

Typical Pedon

A—0 to 1 inch; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 35 percent gravel; neutral; abrupt smooth boundary.

E—1 inch to 3 inches; light brownish gray (10YR 6/2) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium platy structure; hard, firm, sticky and plastic; many roots; many fine vesicular pores; 20 percent gravel; slightly acid; abrupt smooth boundary.

Bt1—3 to 8 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; strong fine angular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 5 percent gravel; neutral; clear smooth boundary.

Bt2—8 to 12 inches; light yellowish brown (10YR 6/4) clay, yellowish brown (10YR 5/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 10 percent gravel; neutral; abrupt smooth boundary.

2Bk—12 to 21 inches; pale brown (10YR 6/3) extremely gravelly loam, yellowish brown (10YR 5/4) moist; massive; very hard, very firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 70 percent gravel; strongly effervescent; moderately alkaline; abrupt smooth boundary.

2Bkqm—21 to 32 inches; white (10YR 8/1) fractured indurated duripan, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; many $^1/_8$-inch-thick silica-cemented laminations throughout duripan; few very fine roots in fractures of duripan; fractures $^1/_4$ inch wide and 10 inches apart; violently effervescent; moderately alkaline; abrupt smooth boundary.

2Bkq—32 to 60 inches; brownish yellow (10YR 6/6) weakly cemented extremely gravelly sand, dark yellowish brown (10YR 3/6) moist; massive; slightly hard, very friable; few very fine roots; 70 percent gravel; slightly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Elhina very gravelly loam, 2 to 6 percent slopes
Location in survey area: About 14 miles south of Salmon Falls Dam; in the NE$^1/_4$SW$^1/_4$NE$^1/_4$ of sec. 22, T. 16 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—36 to 50 percent

A horizon:
Value—2 or 3 moist
Chroma—2 or 3

E horizon:
Chroma—2 or 3
Texture—gravelly clay loam or gravelly loam
Gravel content—20 to 30 percent
Clay content—20 to 30 percent

Bt horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 to 4
Texture—clay, gravelly clay, or gravelly clay loam
Gravel content—5 to 30 percent
Clay content—36 to 50 percent
Reaction—slightly acid or neutral

2Bkqm horizon:
Thickness of upper silica lamination—1 inch to 3 inches
Thickness of lower silica laminations—$^1/_8$ inch to 3 inches
Thickness of duripan—10 to 24 inches

Elijah Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 6 percent
Elevation: 4,600 to 5,200 feet
Average annual precipitation: 8 to 11 inches

Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 120 days

Taxonomic class: Fine-silty, mixed, mesic Xerollic Durargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bt1—3 to 7 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; many roots; many very fine tubular pores; common faint clay films on faces of peds and in pores; neutral; clear smooth boundary.
Bt2—7 to 14 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; neutral; abrupt smooth boundary.
Bk—14 to 38 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; violently effervescent (17 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
Bkqm—38 to 60 inches; white (10YR 8/2) fractured duripan, light gray (10YR 7/2) moist; platy; indurated; extremely hard, extremely firm; many 1- to 3-inch-thick lime-and silica-cemented lenses with weakly cemented sandy loam between lenses; duripan massive at at depth of 52 inches; few very fine roots in fractures of duripan; fractures 1/8 to 3/4 inch wide and 8 inches apart; violently effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Elijah-Pigtail complex, 1 to 6 percent slopes
Location in survey area: About 18 miles west of Rogerson, Idaho; in the SW1/4SW1/4NW1/4 of sec. 28, T. 13 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—26 to 35 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Gravel content—0 to 5 percent
Reaction—neutral or mildly alkaline

Bt horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4
Texture—silt loam or silty clay loam
Reaction—neutral or mildly alkaline

Bk horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—3 or 4
Texture—loam or silt loam
Gravel content—0 to 5 percent
Clay content—12 to 18 percent

Bkqm horizon:
Thickness of upper silica lamination—1 inch to 3 inches
Thickness of lower silica laminations—1 inch to 8 inches
Cementation between laminations—weak to strong
Thickness of duripan—20 to 40 inches

Emberton Series

Depth class: Moderately deep to basalt
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Position on landscape: Terraces
Parent material: Kind—wind-modified alluvium; source—mixed
Slope range: 1 to 6 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 50 to 52 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Sandy, mixed, mesic Xeric Torriorthents

Typical Pedon

A—0 to 8 inches; yellowish brown (10YR 5/4) loamy fine sand, dark brown (10YR 3/3)

moist; single grain; loose; common roots; many very fine irregular pores; slightly acid; gradual wavy boundary.
C1—8 to 32 inches; yellowish brown (10YR 5/4) loamy fine sand, brown (10YR 4/3) moist; massive; loose; common roots; many very fine irregular pores; slightly acid; clear wavy boundary.
2C2—32 to 39 inches; pale brown (10YR 6/3) fine sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable; few very fine and fine roots; common very fine and fine tubular pores; 5 percent gravel; mildly alkaline; abrupt smooth boundary.
3R—39 inches; basalt.

Typical Pedon Location

Map unit in which located: Kecko-Emberton complex, 1 to 6 percent slopes
Location in survey area: About 9 miles northeast of Twin Falls, Idaho; in the $SW^1/_4SW^1/_4NE^1/_4$ of sec. 23, T. 9 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches

Particle-size control section:
Clay content—5 to 10 percent

A and C horizons:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Reaction—slightly acid or neutral

2C2 horizon:
Value—6 or 7 dry
Chroma—2 to 4
Texture—fine sandy loam or sandy loam
Gravel content—0 to 10 percent
Reaction—neutral or mildly alkaline

Fathom Series

Depth class: Very deep
Drainage class: Somewhat excessively drained
Permeability: Rapid
Position on landscape: Alluvial fans, terraces, and breaks
Parent material: Kind—wind-modified alluvium; source—mixed
Slope range: 0 to 60 percent
Elevation: 3,000 to 3,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Sandy, mixed, mesic Xerollic Calciorthids

Typical Pedon

A—0 to 9 inches; brown (10YR 5/3) loamy fine sand, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable; many very fine roots and common fine roots; moderately alkaline; abrupt smooth boundary.
Bw—9 to 26 inches; pale brown (10YR 6/3) loamy fine sand, very dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; soft, very friable; common very fine roots; moderately alkaline; abrupt wavy boundary.
Bk—26 to 60 inches; pale brown (10YR 6/3) loamy fine sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable; common very fine roots; strongly effervescent (8 percent calcium carbonate equivalent); strongly alkaline.

Typical Pedon Location

Map unit in which located: Fathom loamy fine sand, 0 to 12 percent slopes
Location in survey area: About 3.5 miles north of Kimberly, Idaho; in the $SW^1/_4SE^1/_4NW^1/_4$ of sec. 4, T. 10 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—15 to 27 inches

Particle-size control section:
Clay content—0 to 5 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw and Bk horizons:
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 or 3
Texture—loamy fine sand or loamy sand

Flatron Series

Depth class: Shallow to welded tuff
Drainage class: Well drained
Permeability: Slow

Position on landscape: Ridges and dip slopes
Parent material: Kind—residuum; source—welded tuff
Slope range: 2 to 20 percent
Elevation: 5,000 to 5,700 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Clayey-skeletal, montmorillonitic, mesic Lithic Argixerolls

Typical Pedon

A—0 to 4 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 25 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; abrupt smooth boundary.

Bt1—4 to 6 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

Bt2—6 to 12 inches; brown (10YR 5/3) extremely gravelly clay, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common distinct clay films on faces of peds and in pores; 35 percent gravel, 20 percent cobbles, and 10 percent stones; thin carbonate coating on underside of welded tuff fragments; mildly alkaline; abrupt smooth boundary.

R—12 inches; gray (10YR 6/1) welded tuff, dark gray (10YR 4/1) moist.

Typical Pedon Location

Map unit in which located: Ragpie-Flatron complex, 2 to 20 percent slopes
Location in survey area: About 7 miles east of Hollister, Idaho; in the $SE^1/_4SW^1/_4NE^1/_4$ of sec. 26, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—10 to 20 inches
Thickness of mollic epipedon—10 to 20 inches

Particle-size control section:
Clay content—36 to 50 percent

A horizon:
Value—2 or 3 moist
Chroma—2 or 3
Gravel content—25 to 40 percent
Cobble content—5 to 10 percent
Stone content—5 to 10 percent

Bt horizon:
Chroma—2 or 3
Texture—very gravelly clay loam, very cobbly clay, extremely cobbly clay loam, or extremely gravelly clay
Gravel content—20 to 40 percent
Cobble content—20 to 25 percent
Stone content—5 to 15 percent

Forvic Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium and colluvium; source—welded tuff
Slope range: 2 to 6 percent
Elevation: 5,800 to 6,200 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 41 to 43 degrees F
Frost-free period: 80 to 90 days

Taxonomic class: Fine, montmorillonitic, frigid Typic Durixerolls

Typical Pedon

A—0 to 7 inches; dark grayish brown (10YR 4/2) silty clay loam, black (10YR 2/1) moist; moderate medium platy structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent gravel; slightly acid; clear smooth boundary.

Bt1—7 to 12 inches; brown (10YR 4/3) clay, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; many very fine and fine roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 10 percent gravel; slightly acid; gradual wavy boundary.

Bt2—12 to 21 inches; dark brown (10YR 3/3)

gravelly clay, dark brown (10YR 3/3) moist; strong coarse prismatic structure parting to strong medium angular blocky; extremely hard, extremely firm, very sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; many prominent clay films on faces of peds and in pores; 15 percent gravel; slightly acid; abrupt smooth boundary.

Bt3—21 to 30 inches; light brown (7.5YR 6/4) very gravelly sandy clay, brown (7.5YR 4/4) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 35 percent gravel; slightly acid; abrupt smooth boundary.

Bkqm—30 to 35 inches; white (10YR 8/2) indurated duripan, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; few very fine and fine roots in fractures of duripan; many continuous silica laminations between cemented gravel; fractures 1/4 inch wide and 10 inches apart; violently effervescent; abrupt smooth boundary.

2Cr—35 to 39 inches; very pale brown (10YR 7/4) welded volcanic ash, dark yellowish brown (10YR 4/6) moist; moderate medium platy structure; top of plates slightly effervescent.

Typical Pedon Location

Map unit in which located: Forvic silty clay loam, 2 to 6 percent slopes

Location in survey area: About 19 miles southeast of Rogerson, Idaho; in the NE1/4SE1/4SE1/4 of sec. 21, T. 16 S., R. 18 E.

Range in Characteristics

Profile:
Depth to welded ash—24 to 50 inches
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—20 to 30 inches

Particle-size control section:
Clay content—50 to 59 percent

A horizon:
Value—3 or 4 dry
Chroma—1 or 2
Gravel content—5 to 25 percent

Bt1 and Bt2 horizons:
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—clay or gravelly clay
Gravel content—10 to 30 percent

Bt3 horizon:
Hue—10YR or 7.5YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—very gravelly sandy clay or very gravelly clay
Gravel content—35 to 55 percent

Bkqm horizon:
Thickness of upper silica lamination—1/2 inch to 2 inches
Thickness of lower silica laminations—1/4 to 1 inch
Thickness of duripan—4 to 11 inches

Gosinta Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Moderately slow
Position on landscape: Alluvial terraces
Parent material: Kind—recent alluvium; source—mixed
Slope range: 0 to 2 percent
Elevation: 3,000 to 5,000 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Cumulic Haploxerolls

Typical Pedon

A1—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium platy structure; hard, friable, slightly sticky and slightly plastic; many roots; few very fine tubular pores; neutral; abrupt smooth boundary.

A2—2 to 8 inches; grayish brown (10YR 5/2) silt loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; mildly alkaline; gradual wavy boundary.

AB—8 to 24 inches; grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; strongly effervescent in

places (5 percent calcium carbonate equivalent); mildly alkaline; gradual wavy boundary.
Bw—24 to 38 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 3/3) moist; common medium mottles that are strong brown (7.5YR 5/6) when moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; neutral; clear smooth boundary.
C1—38 to 50 inches; pale brown (10YR 6/3) sandy loam, very dark grayish brown (10YR 3/2) moist; common medium to large mottles that are strong brown (7.5YR 5/6) when moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 10 percent gravel; neutral; abrupt smooth boundary.
2C2—50 to 65 inches; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; common medium to large mottles that are strong brown (7.5YR 5/6) when moist; massive; slightly hard, friable; few very fine roots; few very fine irregular pores; 45 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Gosinta silt loam, 0 to 2 percent slopes
Location in survey area: About 3 miles south of Rock Creek, Idaho; in the NE$^1/_4$SE$^1/_4$SE$^1/_4$ of sec. 11, T. 12 S., R. 18E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to mottles—24 to 60 inches
Depth to water table—24 to 48 inches
Thickness of mollic epipedon—24 to 30 inches

Particle-size control section:
Clay content—20 to 30 percent

A1 horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—0 to 10 percent
Reaction—neutral or mildly alkaline

Bw and C1 horizons:
Value—5 or 6 dry, 2 to 4 moist
Chroma—2 to 4
Texture—loam, clay loam, or sandy loam

2C2 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Texture—very gravelly sandy loam or very gravelly loam
Gravel content—35 to 55 percent

Harsan Series

Depth class: Deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—wind-modified alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 4 inches; brown (10YR 5/3) loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; common very fine, fine, and medium roots; many very fine irregular pores; slightly acid; gradual wavy boundary.
AB—4 to 9 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable; few very fine, fine, and medium roots; many very fine irregular pores; neutral; clear smooth boundary.
Bt1—9 to 19 inches; yellowish brown (10YR 5/4) sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; many fine tubular pores; common faint clay films on faces of peds and in pores and some clay bridges between sand grains; neutral; clear smooth boundary.
Bt2—19 to 34 inches; light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; strong medium subangular blocky structure; extremely hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common fine tubular pores; common faint clay films on faces of peds and in pores and some clay bridges between

sand grains; mildly alkaline; gradual wavy boundary.
2Bkq—34 to 54 inches; very pale brown (10YR 7/3) clay loam, dark yellowish brown (10YR 4/4) moist; moderate thin platy structure; very hard, firm, sticky and plastic; few very fine and fine roots; few fine tubular pores; 5 percent gravel; strongly effervescent (18 percent calcium carbonate equivalent); many soft lime masses; mildly alkaline; abrupt wavy boundary.
2Bkqm—54 to 60 inches; very pale brown (10YR 8/3) duripan, light yellowish brown (10YR 6/4) moist; extremely hard, extremely firm.

Typical Pedon Location

Map unit in which located: Harsan-Sidlake-Quincy complex, 1 to 8 percent slopes
Location in survey area: About 6 miles northwest of Jerome, Idaho; in the $SE^1/_4SW^1/_4SE^1/_4$ of sec. 20, T. 7 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—40 to 60 inches

Particle-size control section:
Clay content—18 to 30 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Reaction—slightly acid or neutral

Bt horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—3 or 4
Texture—sandy loam or sandy clay loam
Reaction—neutral or mildly alkaline

2Bkq horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—clay loam, gravelly clay loam, or silt loam
Gravel content—0 to 20 percent

Hogmalat Series

Depth class: Shallow to welded tuff
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Shoulders and summits
Parent material: Kind—residuum; source—welded tuff
Slope range: 3 to 40 percent
Elevation: 6,800 to 7,600 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 36 to 39 degrees F
Frost-free period: 20 to 50 days

Taxonomic class: Loamy-skeletal, mixed Argic Lithic Cryoborolls

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 70 percent gravel; strongly acid; clear smooth boundary.
Bt1—3 to 9 inches; brown (10YR 4/3) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common roots; many very fine tubular pores; few faint clay films on faces of peds and in pores; 35 percent gravel; moderately acid; gradual wavy boundary.
Bt2—9 to 15 inches; brown (10YR 4/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; few roots; few very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel; strongly acid; abrupt wavy boundary.
R—15 inches; brown (10YR 4/3) welded tuff, dark yellowish brown (10YR 3/4) moist.

Typical Pedon Location

Map unit in which located: Hogmalat-Rock outcrop complex, 3 to 40 percent slopes
Location in survey area: About 13 miles southwest of Rogerson, Idaho; in the $SE^1/_4NE^1/_4NE^1/_4$ of sec. 16, T. 15 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—9 to 20 inches
Thickness of mollic epipedon—10 to 20 inches
Base saturation—50 to 55 percent

Particle-size control section:
Clay content—24 to 34 percent

A horizon:
Value—3 to 5 dry, 2 or 3 moist

Chroma—1 to 3
Reaction—strongly acid or moderately acid

Bt horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Texture—very gravelly clay loam or very gravelly loam
Gravel content—35 to 55 percent
Reaction—strongly acid or moderately acid

Hoosegow Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 2 to 15 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bw—6 to 15 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; neutral; gradual wavy boundary.
Bt—15 to 35 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine and fine roots; many fine tubular pores; common distinct clay films on faces of peds and in pores; neutral; gradual wavy boundary.
BC1—35 to 50 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; many fine tubular pores; mildly alkaline; gradual wavy boundary.
BC2—50 to 62 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; slightly effervescent; mildly alkaline; abrupt smooth boundary.
BC3—62 to 72 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; massive; slightly hard, very friable; strongly effervescent; mildly alkaline.

Typical Pedon Location

Map unit in which located: Hoosegow-Sidlake-Rock outcrop complex, 2 to 15 percent slopes
Location in survey area: About 12 miles northeast of Jerome, Idaho; in the $SE^1/_4SE^1/_4NE^1/_4$ of sec. 16, T. 7 S., R. 18 E.

Range in Characteristics

Particle-size control section:
Clay content—20 to 27 percent

A horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4

Bt horizon:
Value—5 or 6 dry
Chroma—3 or 4
Texture—loam or sandy clay loam

Howcree Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff and volcanic ash
Slope range: 2 to 6 percent
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Ultic Argixerolls

Typical Pedon

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many fine and very fine

tubular pores; slightly acid; clear smooth boundary.
Bt1—4 to 11 inches; grayish brown (10YR 5/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common roots; many fine and very fine tubular pores; few faint clay films on faces of peds and in pores; 30 percent gravel; slightly acid; gradual wavy boundary.
Bt2—11 to 19 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 3/3) moist; strong fine angular blocky structure; hard, firm, very sticky and very plastic; common roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 35 percent gravel; slightly acid; gradual wavy boundary.
Bt3—19 to 30 inches; pale brown (10YR 6/3) very gravelly clay, brown (10YR 4/3) moist; strong fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 55 percent gravel; neutral; gradual wavy boundary.
Bq—30 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; strong fine angular blocky structure; very hard, firm, slightly sticky and slightly plastic; few very fine to medium roots; few very fine tubular pores; 80 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Howcree-Ibola complex, 2 to 6 percent slopes
Location in survey area: About 22 miles southwest of Rogerson, Idaho; in the SW$^1/_4$NE$^1/_4$NW$^1/_4$ of sec. 11, T. 15 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—12 to 20 inches
Base saturation in upper 30 inches—60 to 70 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3

Bt1 and Bt2 horizons:
Hue—10YR or 7.5YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Reaction—slightly acid or neutral
Texture—gravelly clay loam, gravelly clay, or very gravelly clay
Gravel content—25 to 50 percent
Clay content—35 to 45 percent

Bt3 horizon:
Hue—10YR or 7.5YR
Value—5 or 6 dry
Chroma—3 or 4
Reaction—slightly acid or neutral
Texture—very gravelly clay or very gravelly sandy clay
Gravel content—40 to 55 percent
Cobble content—0 to 5 percent
Clay content—45 to 55 percent

Hutton Series

Depth class: Very deep
Drainage class: Poorly drained
Permeability: Very slow
Position on landscape: Flood plains
Parent material: Kind—recent alluvium; source—welded tuff and volcanic ash
Slope range: 0 to 2 percent
Elevation: 5,500 to 5,800 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 44 to 46 degrees F
Frost-free period: 50 to 90 days

Taxonomic class: Fine, montmorillonitic, frigid Cumulic Haplaquolls

Typical Pedon

0e—0 to 2 inches; organic matter; decomposing plant roots and leaves intermixed within grass sod.
A1—2 to 6 inches; very dark gray (N 3/0) silty clay loam, black (N 2/0) moist; moderate medium granular structure; hard, firm, sticky and plastic; many very fine and fine roots; many fine tubular pores; neutral; clear smooth boundary.
A2—6 to 14 inches; very dark gray (N 3/0) silty clay loam, black (N 2/0) moist; moderate coarse prismatic structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; common fine tubular pores; neutral; clear smooth boundary.

BA—14 to 26 inches; gray (N 5/0) silty clay loam, very dark gray (N 3/0) moist; weak medium prismatic structure; hard, firm, very sticky and very plastic; common very fine and fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.
Bg1—26 to 41 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; common medium prominent mottles that are light olive brown (2.5Y 5/6) when moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; neutral; clear smooth boundary.
Bg2—41 to 50 inches; gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; many large prominent mottles that are olive brown (2.5Y 4/4) when moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; neutral; gradual wavy boundary.
2Bg3—50 to 62 inches; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; many medium prominent mottles that are light olive brown (2.5Y 5/6) when moist; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; neutral.

Typical Pedon Location

Map unit in which located: Hutton mucky peat, 0 to 2 percent slopes
Location in survey area: About 18 miles southwest of Rogerson, Idaho; in the $SW^1/_4SW^1/_4NW^1/_4$ of sec. 12, T. 15 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to water table—12 to 24 inches
Thickness of mollic epipedon—24 to 30 inches

Particle-size control section:
Clay content—35 to 40 percent

A1 horizon:
Hue—10YR or neutral
Value—3 to 5 dry, 2 or 3 moist
Chroma—0 to 2

Bg1 horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 3 to 5 moist
Chroma—1 or 2
Texture—silty clay loam or clay loam

Bg2 and Bg3 horizons:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 2 to 5 moist
Chroma—1 or 2
Texture—clay loam or clay
Clay content—30 to 50 percent

Ibola Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—mixed alluvium; source—welded tuff and volcanic ash
Slope range: 2 to 6 percent
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 41 to 46 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Fine-loamy, mixed, frigid Typic Durixerolls

Typical Pedon

A—0 to 4 inches; brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; 5 percent gravel; slightly acid; abrupt smooth boundary.
Bt1—4 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; moderately acid; clear smooth boundary.
Bt2—8 to 18 inches; grayish brown (10YR 5/2) clay loam, dark brown (7.5YR 3/2) moist; strong medium angular blocky structure; hard, firm, sticky and plastic; common roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; moderately acid; clear smooth boundary.
Bt3—18 to 27 inches; light brown (7.5YR 6/4) gravelly loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common roots; common very fine and fine tubular pores; few faint clay

films on faces of peds and in pores; 15 percent gravel; moderately acid; abrupt smooth boundary.
Bqm—27 to 28 inches; white (10YR 8/2) duripan, light gray (10YR 7/2) moist; continuous silica cap over noncalcareous matrix; abrupt smooth boundary.
Crk—28 to 64 inches; light brown (7.5YR 6/4) semiconsolidated volcanic ash, brown (7.5YR 4/4) moist; noncalcareous matrix with lime masses intermixed.

Typical Pedon Location

Map unit in which located: Howcree-Ibola complex, 2 to 6 percent slopes
Location in survey area: About 23 miles southwest of Rogerson, Idaho; in the NW$^1/_4$SW$^1/_4$SW$^1/_4$ of sec. 11, T. 15 S., R. 12 E.

Range in Characteristics

Profile:
Depth to weathered bedrock—20 to 40 inches
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—11 to 19 inches
Thickness of duripan—1 inch to 4 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—0 to 10 percent
Reaction—slightly acid or neutral

Bt horizon:
Hue—10YR or 7.5YR
Value—4 to 6 dry, 2 to 4 moist
Chroma—2 to 4
Texture—loam, clay loam, gravelly loam, or gravelly clay loam
Clay content—24 to 34 percent
Gravel content—0 to 25 percent
Cobble content—0 to 5 percent
Reaction—moderately acid to neutral

Idow Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 4 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Durargids

Typical Pedon

Ap1—0 to 3 inches; yellowish brown (10YR 5/4) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; common very fine and fine irregular pores; neutral; gradual smooth boundary.
Ap2—3 to 7 inches; yellowish brown (10YR 5/4) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; common very fine irregular pores and few fine irregular pores; neutral; clear smooth boundary.
Bt1—7 to 12 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; common fine tubular pores; common faint clay films on faces of peds and in pores; neutral; gradual smooth boundary.
Bt2—12 to 23 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine roots; common fine tubular pores; common faint clay films on faces of peds and in pores; neutral; gradual smooth boundary.
Bk—23 to 39 inches; very pale brown (10YR 7/3) silt loam, light yellowish brown (10YR 6/4) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine roots; few fine tubular pores; 5 percent gravel and 5 percent cobbles; violently effervescent (35 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
Bkqm—39 to 60 inches; very pale brown (10YR 8/3) fractured duripan, very pale brown (10YR 7/3) moist; platy; indurated; extremely hard, extremely firm; $^1/_4$-inch-thick laminar silica lenses with gravelly sandy loam between plates; fractures more than 10 inches apart; violently effervescent.

Typical Pedon Location

Map unit in which located: Paulville-Idow complex, 1 to 4 percent slopes
Location in survey area: About 4 miles north of Jerome, Idaho; in the NE¼NE¼NE¼ of sec. 30, T. 7 S., R. 17 E.

Range in Characteristics

Profile:
Depth to secondary lime—17 to 33 inches
Depth to duripan—20 to 40 inches

Ap1 horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—loam or clay loam
Clay content—20 to 30 percent

Bk horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—3 or 4
Texture—silt loam, clay loam, or loam
Gravel content—0 to 5 percent
Cobble content—0 to 5 percent
Durinode content—0 to 10 percent
Effervescence—slight to violent

Isknat Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Fan terraces and alluvial fans
Parent material: Kind—colluvium; source—mixed
Slope range: 2 to 15 percent
Elevation: 5,200 to 5,900 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 80 to 90 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Pachic Ultic Argixerolls

Typical Pedon

A—0 to 8 inches; gray (10YR 5/1) gravelly loam, very dark gray (10YR 3/1) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; 25 percent gravel; slightly acid; clear smooth boundary.
Bt1—8 to 14 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel; neutral; gradual wavy boundary.
Bt2—14 to 23 inches; dark grayish brown (10YR 4/2) very gravelly clay, black (10YR 2/1) moist; strong fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 50 percent gravel; slightly acid; abrupt smooth boundary.
Bt3—23 to 38 inches; pale brown (10YR 6/3) extremely gravelly clay, brown (10YR 4/3) moist; moderate fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 70 percent gravel; slightly acid; abrupt smooth boundary.
2C—38 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; massive; extremely hard, very firm; few very fine tubular pores; 70 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Isknat gravelly loam, 3 to 15 percent slopes
Location in survey area: About 13 miles southwest of Rogerson, Idaho; in the NW¼NW¼NW¼ of sec. 26, T. 15 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—20 to 34 inches
Base saturation—65 to 75 percent

Particle-size control section:
Clay content—35 to 50 percent

A horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 to 3

Bt1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 or 2

Texture—very gravelly clay loam or gravelly clay loam
Gravel content—30 to 50 percent

Bt2 and Bt3 horizons:
Hue—10YR or 7.5YR
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 to 4
Texture—very gravelly clay or extremely gravelly clay
Gravel content—40 to 70 percent
Cobble content—0 to 5 percent
Reaction—slightly acid or neutral

2Bt horizon (where present):
Texture—clayey below a depth of 40 inches

2C horizon (where present):
Value—5 to 8 dry, 4 to 6 moist
Chroma—3 to 6
Texture—extremely gravelly sandy loam or extremely gravelly loamy sand (sandy-skeletal below a depth of 40 inches only)
Gravel content—60 to 70 percent
Cobble content—10 to 20 percent

Iwica Series

Depth class: Deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 2 to 6 percent
Elevation: 5,500 to 6,000 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Fine, montmorillonitic, frigid Calcic Pachic Argixerolls

Typical Pedon

A—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 5 percent gravel; slightly acid; clear smooth boundary.
Bt1—5 to 12 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; strong fine angular blocky structure; hard, friable, sticky and plastic; many very fine and fine roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; slightly acid; clear wavy boundary.
Bt2—12 to 21 inches; brown (10YR 5/3) clay, dark brown (10YR 3/3) moist; moderate medium prismatic structure; very hard, very firm, very sticky and very plastic; common roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; 5 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
Bt3—21 to 30 inches; pale brown (10YR 6/3) clay, brown (10YR 4/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; common roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 5 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
Bk—30 to 42 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few roots; few very fine tubular pores; 20 percent gravel; strongly effervescent (35 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
2Bkqm—42 to 60 inches; white (10YR 8/1) duripan, light gray (10YR 7/2) moist; indurated; extremely hard, extremely firm; $^{1}/_{8}$-inch-thick laminar cap over strongly cemented sand and gravel.

Typical Pedon Location

Map unit in which located: Iwica-Budlewis complex, 2 to 6 percent slopes
Location in survey area: About 36 miles southwest of Twin Falls, Idaho; in the NW$^{1}/_{4}$SE$^{1}/_{4}$SW$^{1}/_{4}$ of sec. 29, T. 14 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—40 to 60 inches
Thickness of mollic epipedon—20 to 26 inches
Base saturation—65 to 75 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 or 2

Bt horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—2 or 3

Texture—silty clay loam or clay
Gravel content—0 to 5 percent
Cobble content—0 to 5 percent
Clay content—30 to 55 percent

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4
Texture—gravelly loam or gravelly clay loam
Gravel content—20 to 30 percent
Clay content—20 to 35 percent

Bkqm horizon:
Thickness of upper silica lamination—1/8 to 1 inch
Thickness of duripan—20 inches or more

Jestrick Series

Depth class: Moderately deep to a duripan
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Position on landscape: Terraces
Parent material: Kind—eolian material; source—mixed
Slope range: 1 to 8 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Durorthids

Typical Pedon

Ap—0 to 12 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; single grain; loose; many very fine and fine roots; many very fine and fine interstitial pores; 2 percent gravel; neutral; abrupt smooth boundary.
Bw1—12 to 22 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; weak fine granular structure; loose; common very fine and fine roots; many very fine and fine tubular pores; 2 percent gravel; mildly alkaline; clear wavy boundary.
Bw2—22 to 31 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable; few very fine roots; many very fine and fine tubular pores; 2 percent gravel; mildly alkaline; abrupt smooth boundary.
2Bkq—31 to 35 inches; pale brown (10YR 6/3) cobbly loam, brown (10YR 5/3) moist; massive; hard, firm, sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; 5 percent gravel and 10 percent cobbles; violently effervescent (20 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2Bkqm—35 to 39 inches; white (10YR 8/2) indurated duripan, gray (10YR 6/2) moist; many continuous 1/8-inch-thick laminar caps; abrupt wavy boundary.
3R—39 inches; fractured basalt; lime coating on surface and in fractures.

Typical Pedon Location

Map unit in which located: Jestrick-Kecko complex, 1 to 8 percent slopes
Location in survey area: About 6 miles southwest of Jerome, Idaho; in the NW1/4NE1/4SW1/4 of sec. 4, T. 9 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—25 to 40 inches
Depth to duripan—21 to 38 inches

Ap horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—fine sandy loam or sandy loam
Gravel content—0 to 5 percent

2Bkq horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Gravel content—5 to 10 percent
Cobble content—10 to 15 percent
Calcium carbonate equivalent—10 to 20 percent
Effervescence—strong or violent

Kavon Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Hill slopes
Parent material: Kind—glacial till and colluvium; source—welded tuff and volcanic ash
Slope range: 5 to 35 percent
Elevation: 6,800 to 7,700 feet

Average annual precipitation: 20 to 25 inches
Average annual air temperature: 38 to 41 degrees F
Frost-free period: 20 to 50 days

Taxonomic class: Loamy-skeletal, mixed, frigid Xeric Palehumults

Typical Pedon

A1—0 to 4 inches; brown (10YR 4/3) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; 60 percent gravel and 3 percent boulders; extremely acid; clear smooth boundary.
A2—4 to 12 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; 50 percent gravel; extremely acid; gradual wavy boundary.
Bt1—12 to 20 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; few faint clay films on faces of peds and in pores; 50 percent gravel; extremely acid; clear smooth boundary.
Bt2—20 to 39 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine tubular pores; few faint clay films on faces of peds and in pores; 50 percent gravel; extremely acid; clear smooth boundary.
Bt3—39 to 62 inches; light yellowish brown (10YR 6/4) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; few very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel, 20 percent cobbles, and 5 percent stones; extremely acid.

Typical Pedon Location

Map unit in which located: Kavon very gravelly loam, 5 to 35 percent slopes
Location in survey area: About 23 miles southwest of Rogerson, Idaho; in the $SW^1/_4SW^1/_4NW^1/_4$ of sec. 21, T. 16 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of umbric epipedon—30 to 50 inches
Rock fragment content—40 to 80 percent
Base saturation—less than 15 percent

Particle-size control section:
Clay content—20 to 30 percent

A1 and A2 horizons:
Chroma—1 to 3
Reaction—very strongly acid or extremely acid

Bt1 and Bt2 horizons:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—very gravelly loam or extremely gravelly clay loam
Gravel content—40 to 70 percent
Cobble content—0 to 10 percent
Base saturation—5 to 20 percent

Bt3 horizon:
Hue—10YR or 7.5YR
Chroma—3 or 4
Texture—extremely cobbly clay, extremely gravelly clay loam, or extremely cobbly clay loam
Gravel content—35 to 40 percent
Cobble content—20 to 40 percent
Stone content—5 to 10 percent

Kecko Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Terraces
Parent material: Kind—wind-modified alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 2,900 to 4,400 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 7 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; single grain; loose; many roots; many very fine to fine irregular pores; 2 percent gravel; neutral; clear smooth boundary.

Bw—7 to 25 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; loose; many roots; many very fine and fine irregular pores; 5 percent gravel; neutral; abrupt smooth boundary.

Bk1—25 to 38 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 5/3) moist; massive; hard, firm; common very fine and fine roots; common very fine tubular pores; strongly effervescent (15 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bk2—38 to 48 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; moderate medium platy structure; extremely hard, very firm; common very fine and fine roots; few very fine tubular pores; violently effervescent (21 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

2Bk—48 to 74 inches; pale brown (10YR 6/3) fine sand, grayish brown (10YR 5/2) moist; massive; soft, very friable; few very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Kecko-Emberton complex, 1 to 6 percent slopes

Location in survey area: About 6 miles northwest of Eden, Idaho; in the NW$^1/_4$SE$^1/_4$SW$^1/_4$ of sec. 21, T. 9 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—20 to 30 inches

Particle-size control section:
Clay content—10 to 18 percent

A horizon:
Value—5 or 6 dry, 2 to 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—fine sandy loam, sandy loam, or loamy fine sand

Bk horizon:
Value—4 to 6 moist
Chroma—2 or 3
Texture—fine sandy loam, loamy fine sand, loamy sand, or sandy loam
Calcium carbonate equivalent—15 to 25 percent

Keman Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Summits
Parent material: Kind—glacial till and colluvium; source—welded tuff and volcanic ash
Slope range: 2 to 35 percent
Elevation: 6,800 to 7,700 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 38 to 41 degrees F
Frost-free period: 20 to 50 days

Taxonomic class: Loamy-skeletal, mixed Argic Pachic Cryoborolls

Typical Pedon

A—0 to 5 inches; very dark gray (10YR 3/1) very gravelly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 50 percent gravel; moderately acid; gradual wavy boundary.

AB—5 to 14 inches; very dark grayish brown (10YR 3/2) very gravelly loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 50 percent gravel; moderately acid; gradual wavy boundary.

Bt1—14 to 33 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; 55 percent gravel; moderately acid; abrupt smooth boundary.

Bt2—33 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few very fine tubular pores; few faint clay films on faces of peds and in pores; 65 percent gravel; moderately acid.

Typical Pedon Location

Map unit in which located: Keman very gravelly loam, 2 to 35 percent slopes
Location in survey area: About 26 miles southwest of Rogerson, Idaho; in the NW$^{1}/_{4}$NE$^{1}/_{4}$SE$^{1}/_{4}$ of sec. 26, T. 16 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—30 to 50 inches
Rock fragment content—40 to 75 percent
Base saturation—50 to 70 percent

Particle-size control section:
Clay content—18 to 24 percent

A horizon:
Value—3 or 4 dry
Chroma—1 to 3
Reaction—strongly acid or moderately acid

Bt1 horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 to 3
Texture—very gravelly loam or extremely gravelly loam
Clay content—14 to 24 percent
Gravel content—40 to 70 percent
Cobble content—0 to 10 percent

Bt2 horizon:
Value—5 or 6 dry
Chroma—2 to 4
Texture—very gravelly loam or extremely gravelly clay loam
Clay content—24 to 34 percent
Gravel content—40 to 65 percent
Cobble content—0 to 15 percent
Stone content—0 to 5 percent
Reaction—strongly acid or moderately acid

Kudlac Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Terraces and breaks
Parent material: Kind—lacustrine sediment; source—mixed
Slope range: 4 to 60 percent
Elevation: 2,800 to 3,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-silty, mixed (calcareous), mesic Xeric Torriorthents

Typical Pedon

A1—0 to 4 inches; light gray (10YR 7/2) silty clay, yellowish brown (10YR 5/4) moist; moderate very fine granular structure; slightly hard, friable, very sticky and very plastic; common fine roots; common fine vesicular pores; slightly effervescent (6 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
A2—4 to 7 inches; light gray (10YR 7/2) clay, pale brown (10YR 6/3) moist; weak thin platy structure; slightly hard, friable, very sticky and very plastic; common very fine, fine, and medium roots; common very fine tubular pores; slightly effervescent (6 percent calcium carbonate equivalent); few fine segregated lime filaments; moderately alkaline; abrupt smooth boundary.
2Bk1—7 to 11 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; strongly effervescent (8 percent calcium carbonate equivalent); many fine segregated lime filaments; moderately alkaline; abrupt smooth boundary.
2Bk2—11 to 14 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; massive; hard, very firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; few very fine tubular pores; slightly effervescent (5 percent calcium carbonate equivalent); lime in soft segregated masses; moderately alkaline; abrupt smooth boundary.
3Bk3—14 to 27 inches; brown (10YR 5/3) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, very firm, sticky and plastic; few very fine, fine, and medium roots; few very fine and fine tubular pores; strongly effervescent (10 percent calcium

carbonate equivalent); many soft segregated lime masses; moderately alkaline; abrupt smooth boundary.
3C1—27 to 30 inches; white (10YR 8/2) silty clay loam, pale brown (10YR 6/3) moist; massive; very hard, extremely firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; violently effervescent (38 percent calcium carbonate equivalent); strongly alkaline; abrupt smooth boundary.
3C2—30 to 43 inches; brown (7.5YR 5/2) silty clay loam, dark brown (7.5YR 4/2) moist; massive; very hard, very firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; strongly effervescent (9 percent calcium carbonate equivalent); strongly alkaline; clear smooth boundary.
4C3—43 to 60 inches; grayish brown (2.5Y 5/2) silty clay, grayish brown (2.5Y 5/2) moist; massive; hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine and fine tubular pores; few lime veins in noncalcareous matrix; moderately alkaline.

Typical Pedon Location

Map unit in which located: Kudlac silty clay, 4 to 30 percent slopes
Location in survey area: About 14 miles northwest of Buhl, Idaho; in the NE$^{1}/_{4}$NE$^{1}/_{4}$SE$^{1}/_{4}$ of sec. 18, T. 8 S., R. 13 E.

Range in Characteristics

Profile:
Depth to hard lacustrine sediment—4 to 20 inches
Depth to bedrock—more than 60 inches
Calcium carbonate equivalent—5 to 40 percent
Reaction—moderately alkaline or strongly alkaline

Particle-size control section:
Clay content—25 to 34 percent

A1 horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 to 4

2Bk, 3Bk, and 3C horizons:
Hue—10YR, 7.5YR, or 2.5Y
Value—5 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—loam, sandy loam, silt loam, silty clay loam, or silty clay

Lankbush Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Foot slopes and terraces
Parent material: Kind—alluvium; source—welded tuff and volcanic ash
Slope range: 2 to 10 percent
Elevation: 3,000 to 5,500 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 6 inches; brown (10YR 5/3) loamy sand, dark brown (10YR 4/3) moist; single grain; loose; many very fine and fine roots; many very fine discontinuous irregular pores; 5 percent gravel; neutral; abrupt smooth boundary.
Bt—6 to 20 inches, brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine roots; many fine and very fine discontinuous tubular pores; common faint clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.
Bw1—20 to 38 inches; light yellowish brown (10YR 6/4) sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, firm; common very fine roots; common very fine and fine discontinuous tubular pores; 5 percent gravel; mildly alkaline; clear smooth boundary.
Bw2—38 to 46 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; massive; hard, firm; common very fine roots; few very fine and fine discontinuous tubular pores; 10 percent gravel; slightly effervescent; mildly alkaline; clear smooth boundary.
2Bk1—46 to 60 inches; very pale brown (10YR 7/3) loamy sand, light yellowish brown (10YR 6/4) moist; massive; loose; common very fine roots; few very fine and fine discontinuous tubular pores; 5 percent gravel; strongly effervescent; moderately alkaline; clear smooth boundary.

2Bk2—60 to 65 inches; very pale brown (10YR 7/4) sandy loam, light yellowish brown (10YR 6/4) moist; massive; very hard, firm, slightly sticky and slightly plastic; few fine roots; few fine and very fine discontinuous tubular pores; 10 percent gravel; strongly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Lankbush loamy sand, 2 to 10 percent slopes
Location in survey area: About 13 miles southwest of Rogerson, Idaho; in the NE$^1/_4$NW$^1/_4$NW$^1/_4$ of sec. 5, T. 16 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—more than 40 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Gravel content—0 to 10 percent

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Gravel content—0 to 10 percent
Clay content—20 to 29 percent

2Bk horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 or 4
Texture—loamy sand, gravelly loamy sand, or sandy loam
Gravel content—0 to 25 percent
Reaction—mildly alkaline or moderately alkaline

Lud Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 2 to 10 percent
Elevation: 4,500 to 5,300 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 45 to 47 degrees F
Frost-free period: 100 to 120 days

Taxonomic class: Clayey, montmorillonitic, mesic, shallow Xerollic Durargids

Typical Pedon

A—0 to 2 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; 5 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
Bt1—2 to 8 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; weak fine angular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; many very fine tubular pores; few faint clay films on faces of peds and in pores; neutral; clear smooth boundary.
Bt2—8 to 11 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; strong medium angular blocky structure; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; strongly effervescent (4 percent calcium carbonate equivalent); mildly alkaline; clear smooth boundary.
Bkq—11 to 16 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, very firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 20 percent gravel; violently effervescent (32 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
Bkqm—16 to 26 inches; white (10YR 8/1) fractured duripan, very pale brown (10YR 7/3) moist; massive; indurated; extremely hard, extremely firm; many $^1/_8$- to 1-inch-thick lime- and silica-cemented lenses; few very fine roots in fractures of duripan; fractures $^1/_4$ inch wide and 9 inches apart; violently effervescent; moderately alkaline; abrupt wavy boundary.
2R—26 inches; dark gray (10YR 4/1) fractured basalt, black (10YR 2/1) moist; lime coating; violently effervescent.

Typical Pedon Location

Map unit in which located: Lud silt loam, 2 to 10 percent slopes
Location in survey area: About 13 miles west of Rogerson, Idaho; in the NE$^1/_4$NE$^1/_4$NW$^1/_4$ of sec. 17, T. 14 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—21 to 40 inches
Depth to duripan—10 to 20 inches

Particle-size control section:
Clay content—35 to 45 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4
Texture—silty clay loam, silty clay, cobbly silty clay, or cobbly silty clay loam
Reaction—neutral or mildly alkaline

Bkqm horizon:
Thickness of upper silica lamination—1/8 inch to 1 1/2 inches
Thickness of lower silica laminations—1/8 to 1 inch
Cementation between laminations—weak to very strong
Thickness of duripan—3 to 20 inches

Mackey Series

Depth class: Moderately deep to welded tuff
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Dip slopes
Parent material: Kind—residuum and colluvium; source—mixed
Slope range: 8 to 30 percent
Elevation: 4,300 to 5,500 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 100 to 120 days

Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 3/3) moist; weak fine platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 40 percent gravel; neutral; clear wavy boundary.
Bw—3 to 10 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; 30 percent gravel and 5 percent cobbles; mildly alkaline; abrupt smooth boundary.
Bk1—10 to 16 inches; very pale brown (10YR 7/3) extremely cobbly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine irregular pores; 35 percent gravel and 45 percent cobbles; strongly effervescent (17 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
Bk2—16 to 36 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine irregular pores; 50 percent gravel and 20 percent cobbles; strongly effervescent (23 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
R—36 inches; extremely hard welded tuff.

Typical Pedon Location

Map unit in which located: Mackey very gravelly loam, 8 to 30 percent slopes
Location in survey area: About 8 miles northeast of Hollister, Idaho; in the SE1/4NE1/4NW1/4 of sec. 14, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Depth to secondary lime—8 to 20 inches

A horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3
Gravel content—30 to 45 percent
Cobble content—0 to 10 percent

Bw horizon:
Value—6 or 7 dry, 3 or 4 moist
Chroma—3 or 4
Texture—very gravelly clay loam or very gravelly loam
Gravel content—30 to 40 percent
Cobble content—5 to 15 percent

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4
Texture—extremely gravelly sandy loam,

extremely gravelly loam, or very gravelly sandy loam
Gravel content—35 to 50 percent
Cobble content—20 to 45 percent

McCain Series

Depth class: Moderately deep to basalt
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 6 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-silty, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 5 percent gravel; neutral; clear smooth boundary.
Bt—6 to 16 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; mildly alkaline; abrupt smooth boundary.
Bk—16 to 23 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; massive; very hard, friable; few very fine roots; common very fine and fine irregular pores; 10 percent gravel; 10 percent durinodes; strongly effervescent (20 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
R—23 inches; fractured basalt; lime coatings on surface and in fractures.

Typical Pedon Location

Map unit in which located: Power-McCain complex, 1 to 6 percent slopes
Location in survey area: About 10 miles northeast of Jerome, Idaho; in the $NE^1/_4NE^1/_4NE^1/_4$ of sec. 17, T. 7 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches

Particle-size control section:
Clay content—18 to 30 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Gravel content—0 to 10 percent

Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4
Texture—silt loam or silty clay loam

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4
Gravel content—0 to 10 percent
Durinode content—0 to 20 percent

Minidoka Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 4 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Durorthids

Typical Pedon

Ap—0 to 6 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable; many very fine to medium roots; many very fine tubular pores; strongly effervescent; mildly alkaline; gradual wavy boundary.
Bk—6 to 13 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; many very fine to medium roots; many very fine tubular pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bkq1—13 to 20 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; massive; hard, firm; common very fine and fine roots; common very fine tubular pores; 25 percent durinodes; violently effervescent; moderately alkaline; gradual wavy boundary.
Bkq2—20 to 26 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; massive; hard, firm; common very fine and fine roots; common very fine tubular pores; 10 percent gravel-sized duripan fragments; 15 percent durinodes; violently effervescent; moderately alkaline; abrupt smooth boundary.
Bkqm—26 to 40 inches; white (10YR 8/2) indurated duripan, light gray (10YR 7/2) moist; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent; abrupt smooth boundary.
2R—40 inches; basalt.

Typical Pedon Location

Map unit in which located: Minidoka silt loam, 2 to 4 percent slopes
Location in survey area: About 5 miles east of Castleford, Idaho; in the NW$^1/_4$NW$^1/_4$NW$^1/_4$ of sec. 25, T. 10 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches
Depth to duripan—20 to 40 inches
Depth to secondary lime—7 to 16 inches

Ap horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3

Bkq horizon:
Value—6 to 8 dry, 4 or 5 moist
Chroma—2 or 3
Calcium carbonate equivalent—15 to 40 percent
Durinode content—5 to 40 percent
Reaction—moderately alkaline or strongly alkaline

Minveno Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 20 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durorthids

Typical Pedon

Ap—0 to 3 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many fine vesicular pores; strongly effervescent; moderately alkaline; gradual wavy boundary.
Bk1—3 to 8 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; common very fine and fine tubular pores; strongly effervescent; moderately alkaline; gradual wavy boundary.
Bk2—8 to 15 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, very friable; many fine roots; common very fine and fine tubular pores; violently effervescent; moderately alkaline; abrupt smooth boundary.
Bkqm—15 to 30 inches; white (10YR 8/2) indurated duripan, light gray (10YR 7/2) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent; abrupt smooth boundary.
2R—30 inches; basalt.

Typical Pedon Location

Map unit in which located: Minveno silt loam, 2 to 8 percent slopes
Location in survey area: About 3 miles north of Hansen, Idaho; in the SE$^1/_4$SW$^1/_4$NE$^1/_4$ of sec. 12, T. 10 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Depth to duripan—10 to 20 inches

Ap horizon:
Chroma—2 or 3

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3

Texture—silt loam or loam
Reaction—mildly alkaline or moderately alkaline

Mug Series

Depth class: Moderately deep to welded tuff
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Terraces
Parent material: Kind—colluvium and residuum; source—welded tuff
Slope range: 2 to 10 percent
Elevation: 5,600 to 6,300 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Ultic Palexerolls

Typical Pedon

A—0 to 5 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 20 percent gravel and 20 percent cobbles; slightly acid; abrupt smooth boundary.

Bt1—5 to 14 inches; grayish brown (10YR 5/2) extremely gravelly clay loam, very dark grayish brown (10YR 3/2) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 40 percent gravel and 30 percent cobbles; slightly acid; abrupt smooth boundary.

2Bt2—14 to 25 inches; brown (7.5YR 5/4) gravelly clay, dark brown (7.5YR 4/4) moist; strong coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 20 percent gravel and 5 percent cobbles; neutral; abrupt smooth boundary.

2R—25 inches; gray (10YR 6/1) welded tuff, dark gray (10YR 4/1) moist; thin inconsistent calcium carbonate and silica coating on surface.

Typical Pedon Location

Map unit in which located: Mug very cobbly loam, 2 to 10 percent slopes
Location in survey area: About 21 miles southwest of Rogerson, Idaho; in the $SW^1/_4SW^1/_4SW^1/_4$ of sec. 6, T. 15 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 30 inches
Thickness of mollic epipedon—9 to 15 inches
Rock fragment content—40 to 75 percent
Base saturation—65 to 75 percent

Particle-size control section:
Clay content—45 to 55 percent

A horizon:
Value—4 or 5 dry
Chroma—1 to 3

Bt1 horizon:
Chroma—2 or 3
Texture—extremely gravelly clay loam or very gravelly clay
Gravel content—35 to 50 percent
Cobble content—5 to 30 percent

2Bt2 horizon:
Hue—10YR or 7.5YR
Value—4 or 5 dry
Chroma—2 to 4
Gravel content—15 to 25 percent
Cobble content—5 to 10 percent
Reaction—slightly acid or neutral

Nawt Series

Depth class: Deep to welded tuff
Drainage class: Well drained
Permeability: Slow
Position on landscape: Breaks
Parent material: Kind—colluvium and residuum; source—welded tuff and volcanic ash
Slope range: 15 to 75 percent
Elevation: 4,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Fine, montmorillonitic, mesic Ultic Palexerolls

Typical Pedon

A—0 to 5 inches; brown (10YR 5/3) extremely stony loam, dark brown (10YR 3/3) moist; moderate fine platy structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 30 percent gravel, 5 percent cobbles, and 30 percent stones; neutral; abrupt smooth boundary.

Bt1—5 to 10 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 3/3) moist; moderate fine to medium subangular blocky structure; hard, firm, very sticky and very plastic; many fine and very fine roots; many very fine tubular pores; many distinct clay films on faces of peds and in pores; 15 percent gravel; neutral; clear smooth boundary.

Bt2—10 to 18 inches; brown (7.5YR 5/4) gravelly clay, dark brown (7.5YR 4/4) moist; strong medium subangular blocky structure parting to weak medium prismatic; very hard, firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; 20 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

Bt3—18 to 36 inches; light yellowish brown (10YR 6/4) gravelly clay, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; mildly alkaline; clear smooth boundary.

Bk—36 to 45 inches; very pale brown (10YR 7/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; 45 percent gravel and 10 percent cobbles; strongly effervescent in veins; lime segregated in common rounded fine filaments; moderately alkaline; clear smooth boundary.

Cr—45 to 62 inches; brown (7.5YR 4/2) decomposing lime-coated vesicular welded tuff, dark reddish brown (5YR 3/3) moist.

Typical Pedon Location

Map unit in which located: Stricker-Nawt-Rock outcrop association, 30 to 75 percent slopes

Location in survey area: About 8 miles east of Hollister, Idaho; in the $NW^1/_4NE^1/_4SW^1/_4$ of sec. 24, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches
Thickness of mollic epipedon—10 to 18 inches
Base saturation—65 to 75 percent

Particle-size control section:
Clay content—40 to 50 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt horizon:
Hue—10YR or 7.5YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—gravelly silty clay, gravelly clay, or stony clay
Gravel content—10 to 20 percent
Cobble content—0 to 5 percent
Stone content—0 to 5 percent

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4
Texture—gravelly loam, gravelly silt loam, or very gravelly clay loam
Calcium carbonate equivalent—5 to 15 percent
Gravel content—30 to 45 percent
Cobble content—0 to 10 percent

Oshone Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Terraces
Parent material: Kind—alluvium and colluvium; source—welded tuff and volcanic ash
Slope range: 2 to 10 percent
Elevation: 5,500 to 6,100 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 105 days

Taxonomic class: Fine, montmorillonitic, frigid Typic Durixerolls

Typical Pedon

A—0 to 2 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine vesicular pores; 10 percent gravel; slightly acid; abrupt smooth boundary.

AB—2 to 6 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; 10 percent gravel; slightly acid; gradual wavy boundary.

Bt1—6 to 16 inches; brown (10YR 5/3) clay, very dark grayish brown (10YR 3/2) moist; strong medium angular blocky structure; very hard, firm, very sticky and very plastic; common fine and medium roots; common very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 10 percent gravel; slightly acid; abrupt smooth boundary.

Bt2—16 to 27 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 4/3) moist; moderate medium columnar structure parting to moderate medium angular blocky; very hard, very firm, very sticky and very plastic; few fine roots; few very fine and fine tubular pores; many prominent clay films on faces of peds and in pores; 15 percent gravel; neutral; abrupt smooth boundary.

Bt3—27 to 38 inches; light brown (7.5YR 6/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 40 percent gravel; neutral; abrupt smooth boundary.

Bqm—38 to 47 inches; very pale brown (10YR 8/3) indurated duripan, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; continuous silica-laminated cap over strongly cemented material; sand and gravel is extremely hard and extremely firm when moist; few fine roots in fractures of duripan; fractures 1/4 inch wide and 6 inches apart; gradual smooth boundary.

2Bkq—47 to 60 inches; multicolored weakly cemented very gravelly sand; 80 percent gravel; few fine roots; strongly effervescent.

Typical Pedon Location

Map unit in which located: Oshone complex, 2 to 10 percent slopes (fig. 12)

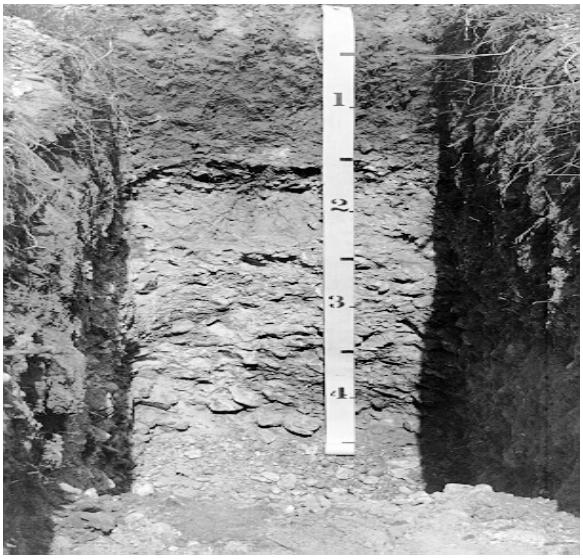

Figure 12.—Profile of Oshone clay loam in an area of Oshone complex, 2 to 10 percent slopes.

Location in survey area: About 13 miles southeast of Rogerson, Idaho; in the NE1/4NE1/4NW1/4 of sec. 2, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—7 to 16 inches

Particle-size control section:
Clay content—45 to 55 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—5 to 15 percent

Bt1 and Bt2 horizons:
Hue—7.5YR or 10YR
Value—3 to 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—clay, gravelly clay, or clay loam
Gravel content—5 to 25 percent
Reaction—slightly acid or neutral

Bqm horizon:
Thickness of upper silica lamination—1/8 to 1 inch
Thickness of lower silica laminations—1/8 inch to 2 inches
Thickness of duripan—5 to 10 inches

Owinza Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Depressions in terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 3 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Fine, montmorillonitic, mesic Xerollic Natrargids

Typical Pedon

A—0 to 4 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; strong medium platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common fine, medium, and coarse vesicular pores; neutral; abrupt smooth boundary.
Btn1—4 to 10 inches; yellowish brown (10YR 5/4) clay, yellowish brown (10YR 5/4) moist; strong medium columnar structure; extremely hard, very firm, very sticky and very plastic; few very fine, fine, and medium roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; slightly effervescent; moderately alkaline; clear wavy boundary.
Btn2—10 to 16 inches; very pale brown (10YR 7/3) clay, brown (10YR 5/3) moist; moderate medium angular blocky structure; very hard, firm, very sticky and very plastic; few very fine, fine, and medium roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; strongly effervescent (8 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
Bk1—16 to 23 inches; white (10YR 8/2) silty clay loam, pale brown (10YR 6/3) moist; massive; very hard, firm, sticky and plastic; few very fine, fine, and medium roots; few very fine tubular pores; violently effervescent (17 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2Bk2—23 to 41 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; 5 percent gravel; violently effervescent (10 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2Bk3—41 to 63 inches; very pale brown (10YR 8/3) loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; 10 percent gravel; violently effervescent (52 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Power-Owinza-Rock outcrop complex, 1 to 8 percent slopes
Location in survey area: About 11 miles northeast of Hazelton, Idaho; in the SE1/4SE1/4SE1/4 of sec. 21, T. 8 S., R. 21 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—12 to 21 inches

Particle-size control section:
Clay content—39 to 48 percent
Sodium absorption ratio—20 to 40 percent

A horizon:
Value—6 or 7 dry, 3 to 5 moist
Chroma—2 or 3
Reaction—neutral or mildly alkaline

Btn horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—3 or 4
Texture—clay or clay loam
Reaction—mildly alkaline or moderately alkaline

Bk1 and 2Bk2 horizons:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—silty clay loam, loam, or gravelly loam
Gravel content—0 to 20 percent
Cobble content—0 to 5 percent
Reaction—moderately alkaline or strongly alkaline

Owsel Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 20 percent
Elevation: 3,500 to 5,500 feet
Average annual precipitation: 8 to 12 inches
Average annual air temperature: 47 to 50 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Fine-silty, mixed, mesic Durixerollic Haplargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; neutral; abrupt smooth boundary.

BA—3 to 9 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

Bt1—9 to 18 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; many very fine to medium tubular pores; common distinct clay films on faces of peds and in pores; neutral; clear wavy boundary.

Bt2—18 to 26 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; very hard, firm, slightly sticky and slightly plastic; common fine roots; common very fine tubular pores; few faint clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.

Bkq—26 to 52 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; very hard, very firm, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 25 percent durinodes; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk—52 to 68 inches; very pale brown (10YR 8/3) sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 5 percent cobbles; violently effervescent; strongly alkaline.

Typical Pedon Location

Map unit in which located: Owsel silt loam, 4 to 8 percent slopes
Location in survey area: About 10 miles west of Rogerson, Idaho; in the $SW^1/_4SW^1/_4SW^1/_4$ of sec. 2, T. 14 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to carbonates—10 to 40 inches
Clay content—24 to 35 percent

A horizon:
Value—5 or 6 dry
Chroma—2 to 4
Reaction—neutral or mildly alkaline

Bt horizon:
Value—4 to 6 dry
Chroma—2 or 3
Texture—silt loam or silty clay loam

Bkq horizon:
Value—6 or 7 dry
Chroma—2 or 3
Texture—fine sandy loam, loam, or silt loam
Reaction—moderately alkaline or strongly alkaline

Paniogue Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 0 to 4 percent
Elevation: 2,800 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 5 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable; common very fine and fine roots; many very fine tubular pores; neutral; gradual wavy boundary.
Bw1—5 to 14 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; common very fine and fine roots; many very fine tubular pores; mildly alkaline; gradual wavy boundary.
Bw2—14 to 25 inches; light yellowish brown (10YR 6/4) very fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable; few very fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; gradual wavy boundary.
Bk—25 to 35 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable; few very fine roots; few very fine tubular pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.
2Bk2—35 to 60 inches; multicolored very gravelly sand; single grain; 45 percent gravel; loose; lime coatings on underside of gravel; strongly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Paniogue loam, 2 to 4 percent slopes
Location in survey area: About 24 miles northwest of Buhl, Idaho; in the NE$^{1}/_{4}$SE$^{1}/_{4}$SE$^{1}/_{4}$ of sec. 11, T. 6 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to contrasting textures—20 to 40 inches

Particle-size control section:
Clay content—6 to 14 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4
Texture—very fine sandy loam or loam
Reaction—mildly alkaline or moderately alkaline

Bk horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 to 4
Texture—very fine sandy loam or loam

Paulville Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 6 percent
Elevation: 3,500 to 5,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

Ap1—0 to 3 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.
Ap2—3 to 8 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.
Bt1—8 to 17 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine tubular pores; few faint clay films on faces of peds and in pores; mildly alkaline; clear smooth boundary.
Bt2—17 to 31 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; mildly alkaline; gradual smooth boundary.
Bk1—31 to 40 inches; very pale brown (10YR 7/3) loam, yellowish brown (10YR 5/4) moist;

moderate medium subangular blocky structure; slightly hard, friable; few very fine roots; few very fine tubular pores; 5 percent gravel; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—40 to 47 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable; few very fine roots; few very fine tubular pores; 5 percent gravel; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bk3—47 to 60 inches; pale brown (10YR 6/3) gravelly loam, yellowish brown (10YR 5/4) moist; massive; hard, firm; few very fine tubular pores; 20 percent gravel; strongly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Paulville-Idow complex, 1 to 4 percent slopes

Location in survey area: About 6 miles north of Jerome, Idaho; in the NW$^1/_4$NW$^1/_4$NE$^1/_4$ of sec. 24, T. 7 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—27 to 32 inches

Ap1 horizon:
Value—4 to 6 dry, 3 or 4 moist

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—silt loam, clay loam, or loam
Clay content—24 to 31 percent

Bk horizon:
Value—6 to 8 dry, 5 or 6 moist
Chroma—2 to 4
Texture—silt loam, loam, or gravelly loam

Pigtail Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Depressions in terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 3 percent
Elevation: 4,600 to 5,500 feet
Average annual precipitation: 9 to 12 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Fine, montmorillonitic, mesic Abruptic Xerollic Durargids

Typical Pedon

A1—0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate coarse platy structure; hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine tubular pores; neutral; abrupt smooth boundary.

A2—3 to 7 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium platy structure; hard, friable, sticky and plastic; many very fine to medium roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt—7 to 18 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; neutral; abrupt wavy boundary.

Bkq—18 to 32 inches; very pale brown (10YR 8/3) loam, pale brown (10YR 6/3) moist; massive; very hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 5 percent gravel; violently effervescent (18 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bkqm—32 to 60 inches; white (10YR 8/1) fractured duripan, very pale brown (10YR 7/3) moist; platy; indurated; extremely hard, extremely firm; many $^1/_2$- to 3-inch-thick lime- and silica-cemented laminations with sandy loam between laminations; few very fine roots in fractures of duripan; fractures $^1/_4$ inch wide and 8 inches apart; violently effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Tanner-Pigtail complex, 1 to 8 percent slopes

Location in survey area: About 20 miles west of Rogerson, Idaho; in the NE$^1/_4$NW$^1/_4$NE$^1/_4$ of sec. 6, T. 14 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches

Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—45 to 55 percent

A1 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4

Bkqm horizon:
Thickness of upper silica lamination—1/2 inch to 3 1/2 inches
Thickness of lower silica laminations—1 inch to 6 inches
Cementation between laminations—weak or strong
Thickness of duripan—21 to 40 inches or more

Player Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Very slow
Position on landscape: Breaks
Parent material: Kind—colluvium; source—welded tuff
Slope range: 30 to 75 percent
Elevation: 5,400 to 6,400 feet
Average annual precipitation: 12 to 15 inches
Average annual air temperature: 40 to 44 degrees F
Frost-free period: 70 to 80 days

Taxonomic class: Clayey-skeletal, montmorillonitic, frigid Ultic Palexerolls

Typical Pedon

A—0 to 5 inches; dark grayish brown (10YR 4/2) very gravelly loam, black (10YR 2/1) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 30 percent gravel and 15 percent cobbles; neutral; gradual smooth boundary.
Bt1—5 to 11 inches; dark grayish brown (10YR 4/2) very gravelly clay, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; 55 percent gravel; slightly acid; clear smooth boundary.
Bt2—11 to 22 inches; brown (10YR 5/3) extremely gravelly clay, dark brown (10YR 4/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 60 percent gravel and 5 percent cobbles; slightly acid; abrupt smooth boundary.
Bt3—22 to 45 inches; light yellowish brown (10YR 6/4) extremely gravelly clay, dark yellowish brown (10YR 4/4) moist; strong fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 70 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
2Bt4—45 to 60 inches; light brown (7.5YR 6/4) extremely gravelly clay, brown (7.5YR 4/4) moist; strong fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine tubular pores; many prominent clay films on faces of peds and in pores; 60 percent gravel and 5 percent cobbles; neutral.

Typical Pedon Location

Map unit in which located: Player-Rock outcrop complex, 30 to 75 percent slopes
Location in survey area: About 19 miles southwest of Rogerson, Idaho; in the NE1/4NW1/4NE1/4 of sec. 29, T. 16 S., R. 14 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Thickness of mollic epipedon—10 to 20 inches
Rock fragment content—45 to 75 percent
Base saturation—55 to 65 percent

Particle-size control section:
Clay content—45 to 60 percent

A horizon:
Value—3 or 4 dry, 2 to 4 moist
Chroma—1 or 2

Bt horizon:
Hue—10YR or 7.5YR
Value—3 to 6 dry, 2 to 4 moist
Chroma—2 to 4
Texture—very gravelly clay or extremely gravelly clay
Gravel content—40 to 70 percent
Cobble content—0 to 10 percent
Reaction—slightly acid or neutral

Portneuf Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 12 percent
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 51 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Durixerollic Calciorthids

Typical Pedon

Ap—0 to 5 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, friable; many very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; gradual wavy boundary.

Bk—5 to 15 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable; common very fine and fine roots; common very fine and fine tubular pores; 5 percent durinodes; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bkq1—15 to 24 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, friable; few very fine and fine roots; common very fine and fine tubular pores; 15 percent durinodes; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkq2—24 to 40 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; very hard, firm; few very fine roots; common very fine tubular pores; 35 percent durinodes; strongly effervescent; moderately alkaline; clear smooth boundary.

2Bk—40 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable; strongly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Portneuf silt loam, 2 to 4 percent slopes

Location in survey area: About 4 miles southeast of Hazelton, Idaho; in the NE¼NE¼SE¼ of sec. 14, T. 10 S., R. 20 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches

Ap horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bk horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3
Reaction—mildly alkaline or moderately alkaline

Bkq horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3
Durinode content—15 to 30 percent
Reaction—moderately alkaline or strongly alkaline

Power Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 3,500 to 4,500 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Fine-silty, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 8 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

Bt—8 to 20 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; many roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; moderately alkaline; abrupt smooth boundary.

Bk1—20 to 34 inches; white (10YR 8/2) loam, brown (10YR 5/3) moist; massive; extremely hard, very firm, slightly sticky; few very fine and fine roots; common very fine tubular

pores; 25 percent nodules; strongly effervescent (16 percent calcium carbonate equivalent); strongly alkaline; clear smooth boundary.
Bk2—34 to 60 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very firm, slightly sticky; few very fine and fine roots; common very fine tubular pores; 10 percent gravel; strongly effervescent (7 percent calcium carbonate equivalent); strongly alkaline.

Typical Pedon Location

Map unit in which located: Power-Owinza-Rock outcrop complex, 1 to 8 percent slopes
Location in survey area: About 12 miles northwest of Buhl, Idaho; in the SE$^1/_4$SW$^1/_4$NW$^1/_4$ of sec. 4, T. 8 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—15 to 24 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—silt loam, loam, or silty clay loam
Clay content—24 to 30 percent
Reaction—mildly alkaline or moderately alkaline

Bk horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—silt loam or loam
Gravel content—0 to 10 percent
Calcium carbonate equivalent—15 to 30 percent

Purdam Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 1 to 30 percent
Elevation: 3,000 to 5,000 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 47 to 51 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Fine-silty, mixed, mesic Haploxerollic Durargids

Typical Pedon

A—0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bt1—4 to 8 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; few faint clay films on faces of peds and in pores; neutral; gradual wavy boundary.
Bt2—8 to 15 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; common distinct clay films on faces of peds and in pores; neutral; clear smooth boundary.
Bkq—15 to 26 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine tubular pores; 10 percent durinodes; strongly effervescent (21 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
Bkqm—26 to 51 inches; thin cemented duripan with $^1/_8$-inch-thick laminar cap over very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; extremely hard, very firm; root mat on laminar cap and few very fine roots along fracture planes; strongly effervescent (16 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.
2Ck—51 to 66 inches; very pale brown (10YR 7/3) very fine sandy loam, yellowish brown (10YR 5/6) moist; massive; slightly hard, friable; strongly effervescent (15 percent calcium carbonate equivalent); mildly alkaline.

Typical Pedon Location

Map unit in which located: Purdam silt loam, 1 to 4 percent slopes
Location in survey area: About 12 miles northwest of Buhl, Idaho; in the NE¼NW¼SE¼ of sec. 12, T. 9 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—8 to 20 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—26 to 32 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—silt loam or silty clay loam

Bkq horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 to 4
Texture—loam or silt loam
Rock fragment content—0 to 10 percent
Clay content—12 to 22 percent
Calcium carbonate equivalent—15 to 30 percent
Durinode content—10 to 30 percent

Bkqm horizon:
Thickness of upper silica lamination—1/16 to 1/2 inch
Texture—very fine sandy loam, loam, or silt loam

Quincy Series

Depth class: Very deep and deep
Drainage class: Excessively drained
Permeability: Rapid
Position on landscape: Terraces
Parent material: Kind—old alluvium and eolian sand; source—mixed
Slope range: 1 to 20 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days
Taxonomic class: Mixed, mesic Xeric Torripsamments

Typical Pedon

A1—0 to 5 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; single grain; loose; many very fine and fine roots and common medium roots; many pores; strongly effervescent (7 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
A2—5 to 39 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; single grain; loose; common very fine and fine roots; many pores; slightly effervescent (7 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
A3—39 to 54 inches; pale brown (10YR 6/3) loamy fine sand, brown (10YR 4/3) moist; single grain; slightly hard, very friable; common very fine and fine roots; many pores; slightly effervescent (10 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.
2Ck—54 to 70 inches; light gray (10YR 7/2) stratified silt loam and fine sandy loam, brown (10YR 5/3) moist; moderate medium platy structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; strongly effervescent (17 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Quincy loamy fine sand, 2 to 20 percent slopes
Location in survey area: About 14 miles northwest of Buhl, Idaho; in the SE¼NE¼NE¼ of sec. 9, T. 8 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—more than 39 inches
Depth to duripan—40 to 60 inches or more

A1 and A2 horizons:
Chroma—2 or 3
Effervescence—none to strong
Reaction—neutral to moderately alkaline

2Ck horizon:
Chroma—2 or 3
Texture—fine sandy loam, silt loam, or clay loam
Reaction—mildly alkaline or moderately alkaline

Rad Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 20 percent
Elevation: 3,200 to 4,500 feet
Average annual precipitation: 8 to 11 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 110 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Durixerollic Camborthids

Typical Pedon

A1—0 to 2 inches; pale brown (10YR 6/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

A2—2 to 6 inches; pale brown (10YR 6/3) silt loam, very dark grayish brown (10YR 3/2) moist; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, few fine and many medium roots; common very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

Bw1—6 to 12 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine roots, common fine roots, and few medium roots; common very fine tubular pores and few fine and medium tubular pores; moderately alkaline; clear smooth boundary.

Bw2—12 to 17 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine roots, common fine roots, and few medium roots; common very fine and fine tubular pores and few medium tubular pores; moderately alkaline; clear smooth boundary.

Bkq1—17 to 26 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores and few fine tubular pores; 25 percent durinodes; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkq2—26 to 32 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores and few fine tubular pores; 20 percent durinodes; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkq3—32 to 41 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores and few fine tubular pores; 15 percent durinodes; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk—41 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores and few fine tubular pores; strongly effervescent; strongly alkaline.

Typical Pedon Location

Map unit in which located: Rad silt loam, 0 to 2 percent slopes
Location in survey area: About 1 mile north of Kimberly, Idaho; in the $SW^1/_4SE^1/_4SE^1/_4$ of sec. 16, T. 10 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—12 to 28 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 or 3
Clay content—6 to 14 percent

Bkq horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 or 3
Effervescence—strongly effervescent or violently effervescent
Reaction—moderately alkaline or strongly alkaline

Durinode content—10 to 40 percent

Ragpie Series

Depth class: Shallow to welded tuff
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Ridges and dip slopes
Parent material: Kind—residuum; source—welded tuff
Slope range: 2 to 20 percent
Elevation: 5,000 to 5,700 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Loamy-skeletal, mixed, mesic Lithic Ultic Argixerolls

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine tubular pores; 35 percent gravel, 15 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

Bt1—3 to 9 inches; brown (10YR 5/3) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine to medium roots; many very fine tubular pores; few faint clay films on faces of peds and in pores; 25 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

Bt2—9 to 16 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 30 percent gravel and 10 percent cobbles; slightly effervescent in places; neutral; abrupt smooth boundary.

R—16 inches; gray (10YR 6/1) fractured welded tuff, dark gray (10YR 4/1) moist; gray (10YR 6/1) lime pendants on underside of welded tuff, dark gray (10YR 4/1) moist; pendants $^1/_8$ to $^1/_4$ inch in diameter.

Typical Pedon Location

Map unit in which located: Ragpie-Flatron complex, 2 to 20 percent slopes
Location in survey area: About 8 miles east of Hollister, Idaho; in the NE$^1/_4$NE$^1/_4$SE$^1/_4$ of sec. 25, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—10 to 20 inches
Thickness of mollic epipedon—8 to 13 inches
Base saturation—65 to 75 percent

Particle-size control section:
Clay content—26 to 34 percent

A horizon:
Chroma—2 or 3

Bt horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Texture—very gravelly clay loam, gravelly loam, very gravelly loam, or gravelly clay loam
Gravel content—25 to 40 percent
Cobble content—5 to 10 percent

Rakane Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 1 to 15 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Durargids

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; 10 percent gravel; slightly acid; clear smooth boundary.

BA—3 to 9 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard,

friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; 5 percent gravel; neutral; clear smooth boundary.

Bt1—9 to 25 inches; light yellowish brown (10YR 6/4) clay loam, brown (10YR 4/3) moist; moderate medium subangular block structure; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 10 percent gravel; neutral; gradual wavy boundary.

Bt2—25 to 38 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few fine medium roots; common fine tubular pores; common distinct clay films on faces of peds and in pores; 30 percent gravel; mildly alkaline; abrupt smooth boundary.

Bkqm—38 to 73 inches; continuous silica- and calcium-cemented indurated duripan; silica lenses 1/4 to 1 inch thick every 3 to 4 inches with extremely hard cemented material between lenses.

Typical Pedon Location

Map unit in which located: Rakane-Blacknest complex, 1 to 4 percent slopes

Location in survey area: About 14 miles northwest of Buhl, Idaho; in the NE1/4NE1/4NW1/4 of sec. 19, T. 8 S., R. 13 E.

Range in Characteristics

Profile:

Depth to bedrock—more than 60 inches

Depth to duripan—20 to 40 inches

Depth to sand and gravel—30 to 60 inches or more

Particle-size control section:

Rock fragment content—0 to 30 percent

Clay content—18 to 32 percent

A horizon:

Value—5 or 6 dry, 3 or 4 moist

Chroma—2 or 3

Gravel content—0 to 10 percent

Bt horizon:

Value—6 or 7 dry, 3 to 5 moist

Texture—gravelly loam, loam, sandy clay loam, or clay loam

Bkqm horizon:

Thickness of duripan—10 to 40 inches or more

Rogerson Series

Depth class: Shallow to a duripan

Drainage class: Well drained

Permeability: Slow

Position on landscape: Terraces

Parent material: Kind—alluvium; source—mixed

Slope range: 2 to 6 percent

Elevation: 5,000 to 5,500 feet

Average annual precipitation: 10 to 14 inches

Average annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 110 days

Taxonomic class: Clayey, montmorillonitic, mesic, shallow Abruptic Xerollic Durargids

Typical Pedon

E—0 to 4 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt1—4 to 10 inches; brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; very hard, very firm, very sticky and very plastic; many very fine and fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; neutral; abrupt smooth boundary.

Bt2—10 to 15 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots; common very fine tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; neutral; clear wavy boundary.

Bkqm—15 to 21 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; massive; very hard, very firm, sticky and plastic; 5 percent gravel; many very hard durinodes 1/4 to 1/2 inch in diameter; weakly cemented to moderately cemented very thin laminar cap at top; strongly effervescent (21 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.

Bk1—21 to 44 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine irregular pores; common fine to medium segregated lime

filaments; strongly effervescent (23 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk2—44 to 62 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine irregular pores; 15 percent gravel; strongly effervescent (53 percent calcium carbonate equivalent); strongly alkaline.

Typical Pedon Location

Map unit in which located: Schnipper-Rogerson complex, 2 to 12 percent slopes
Location in survey area: About 14 miles east of Hollister, Idaho; in the NW¼NW¼SW¼ of sec. 25, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—10 to 20 inches

Particle-size control section:
Clay content—38 to 55 percent

E horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4
Texture—clay, silty clay, or silty clay loam
Gravel content—0 to 10 percent

Bkqm horizon:
Thickness of upper silica lamination—⅛ to ¼ inch
Cementation between laminations—weak to strong
Texture—loam, silty clay loam, or silt loam

Roseworth Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 4,000 to 4,600 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 100 to 120 days
Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; neutral; clear smooth boundary.
Bt—3 to 8 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; many roots; many very fine tubular pores; common faint clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.
Bk—8 to 15 inches; very pale brown (10YR 8/3) silt loam, pale brown (10YR 6/3) moist; massive; very hard, firm, slightly sticky and slightly plastic; common very fine to medium roots; common very fine tubular pores; violently effervescent (18 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
Bkqm—15 to 18 inches; white (10YR 8/1) duripan, light gray (10YR 7/2) moist; platy; indurated; two 1/32-inch-thick lime- and silica-cemented laminar caps; strongly cemented soil material between laminar caps; violently effervescent; moderately alkaline; abrupt smooth boundary.
2Bkq—18 to 27 inches; light yellowish brown (10YR 6/4) sandy loam, yellowish brown (10YR 5/4) moist; massive; very hard, very firm; violently effervescent (25 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2Bkqm—27 to 45 inches; white (10YR 8/1) fractured duripan, light gray (10YR 7/2) moist; platy; indurated; extremely hard, extremely firm; many 2- to 6-inch-thick lime- and silica-cemented lenses; fractures ½ to ¾ inch wide and 8 inches apart; below 45 inches the duripan is massive and restrictive to penetration.

Typical Pedon Location

Map unit in which located: Roseworth silt loam, 1 to 8 percent slopes
Location in survey area: About 19 miles west of Hollister, Idaho; in the NE¼NW¼NW¼ of sec. 21, T. 12 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—6 to 10 inches
Depth to duripan—10 to 20 inches

A horizon:
Value—3 or 4 moist
Chroma—2 or 3
Texture—silt loam or cobbly silt loam
Gravel content—0 to 10 percent
Cobble content—0 to 15 percent
Stone content—0 to 5 percent

Bt horizon:
Chroma—2 or 3
Clay content—24 to 34 percent

Bk horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—2 or 3
Texture—silt loam, silty clay loam, or gravelly loam
Clay content—14 to 30 percent
Reaction—mildly alkaline or moderately alkaline

Bkqm horizon:
Thickness of laminar caps—1/32 to 1/8 inch
Cementation below laminar caps—moderate to very strong
Thickness of duripan—2 to 6 inches

2Bkqm horizon:
Thickness of laminar caps—2 to 6 inches
Structure—massive or platy
Cementation below laminar caps—moderate or strong
Width of fractures—1/4 to 3/4 inch
Distance between fractures—7 to 20 inches
Thickness of duripan—28 to 40 inches or more

Roza Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Slow
Position on landscape: Playas
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 1 percent
Elevation: 4,500 to 4,600 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 50 degrees F
Frost-free period: 110 to 120 days

Taxonomic class: Fine, montmorillonitic, mesic Xerertic Camborthids

Typical Pedon

A1—0 to 1 inch; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; few fine faint mottles, dark yellowish brown (10YR 4/6) moist; moderate medium platy structure; soft, very friable; common very fine, fine, and medium roots; many coarse vesicular pores; 10 percent gravel; neutral; abrupt smooth boundary.

A2—1 inch to 4 inches; light gray (10YR 7/2) clay loam, grayish brown (10YR 5/2) moist; common fine faint mottles, dark yellowish brown (10YR 4/6) moist; strong fine platy structure; slightly hard, friable, sticky and plastic; common very fine, fine, and medium roots; many coarse vesicular pores; 5 percent gravel; neutral; abrupt wavy boundary.

2Bw1—4 to 18 inches; light brownish gray (10YR 6/2) clay, brown (10YR 4/3) moist; strong moderate angular blocky structure; very hard, very firm, very sticky and very plastic; few fine and medium roots; few fine tubular pores; 5 percent gravel; moderately alkaline; gradual wavy boundary.

2Bw2—18 to 30 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few fine and medium roots; few fine tubular pores; 5 percent gravel; moderately alkaline; gradual wavy boundary.

2Ck1—30 to 49 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few fine tubular pores; 5 percent gravel; strongly effervescent in places; lime in veins and pockets; moderately alkaline; gradual wavy boundary.

2Ck2—49 to 73 inches; very pale brown (10YR 7/3) clay loam, yellowish brown (10YR 5/4) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; few fine tubular pores; 5 percent gravel; slightly effervescent; moderately alkaline.

Typical Pedon Location

Map unit in which located: Roza loam, 0 to 1 percent slopes
Location in survey area: About 4 miles northwest of Hollister, Idaho; in the NE1/4NE1/4SE1/4 of sec. 12, T. 12 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches

Particle-size control section:
Clay content—50 to 60 percent
Presence of cracks—surface to a depth of 18 inches

A1 horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 or 3
Gravel content—0 to 10 percent

2Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4
Gravel content—0 to 5 percent

2Ck horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4
Gravel content—0 to 15 percent

Ruclick Series

Depth class: Moderately deep to welded tuff
Drainage class: Well drained
Permeability: Slow
Position on landscape: Dip slopes
Parent material: Kind—colluvium and residuum; source—welded tuff
Slope range: 5 to 30 percent
Elevation: 5,100 to 6,000 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Clayey-skeletal, montmorillonitic, mesic Aridic Argixerolls

Typical Pedon

A—0 to 3 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many very fine and fine tubular pores; 55 percent gravel; slightly acid; clear smooth boundary.
Bt1—3 to 9 inches; brown (10YR 5/3) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; many roots; many very fine and fine tubular pores; few faint clay films on faces of peds and in pores; 30 percent gravel; neutral; clear smooth boundary.
Bt2—9 to 18 inches; brown (10YR 5/3) extremely gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, very sticky and very plastic; common medium and coarse roots; common very fine and fine tubular pores; common distinct clay films on faces of peds and in pores; 50 percent gravel and 10 percent cobbles; neutral; clear smooth boundary.
Bt3—18 to 28 inches; brown (10YR 5/3) extremely gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common medium and coarse roots; few very fine tubular pores; few distinct clay films on faces of peds and in pores; slightly effervescent; 40 percent gravel, 15 percent cobbles, and 5 percent stones; mildly alkaline; abrupt smooth boundary.
R—28 to 36 inches; fractured welded tuff; calcium carbonate coatings in fractures and pockets.

Typical Pedon Location

Map unit in which located: Ruclick very gravelly loam, 5 to 30 percent slopes
Location in survey area: About 5 miles south of Rogerson, Idaho; in the NE$^{1}/_{4}$SW$^{1}/_{4}$SW$^{1}/_{4}$ of sec. 31, T. 14 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches

A horizon:
Value—4 or 5 dry
Chroma—2 or 3

Bt2 and Bt3 horizons:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Texture—extremely gravelly clay loam, very gravelly clay, or extremely cobbly clay
Rock fragment content—35 to 60 percent
Clay content—35 to 50 percent

Rutherford Series

Depth class: Moderately deep to welded tuff
Drainage class: Well drained
Permeability: Slow
Position on landscape: Ridges and dip slopes

Parent material: Kind—residuum; source—welded tuff
Slope range: 2 to 20 percent
Elevation: 6,500 to 7,700 feet
Average annual precipitation: 15 to 20 inches
Average annual air temperature: 37 to 43 degrees F
Frost-free period: 20 to 60 days

Taxonomic class: Loamy-skeletal, mixed Argic Pachic Cryoborolls

Typical Pedon

A—0 to 4 inches; grayish brown (10YR 5/2) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate thick platy structure; hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 70 percent gravel; moderately acid; abrupt smooth boundary.
Bt1—4 to 10 inches; brown (10YR 4/3) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; many roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; 50 percent gravel; moderately acid; gradual wavy boundary.
Bt2—10 to 19 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark brown (10YR 3/3) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; common very fine tubular pores; common prominent clay films on faces of peds and in pores; 60 percent gravel; slightly acid; clear smooth boundary.
Bt3—19 to 26 inches; brown (10YR 5/3) extremely gravelly clay loam, dark brown (10YR 3/3) moist; strong very fine angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine tubular pores; many distinct clay films on faces of peds and in pores; 70 percent gravel; slightly acid; abrupt smooth boundary.
R—26 inches; gray (10YR 5/1) welded tuff, dark gray (10YR 4/1) moist.

Typical Pedon Location

Map unit in which located: Rutherford extremely gravelly loam, 2 to 20 percent slopes
Location in survey area: About 22 miles southwest of Rogerson, Idaho; in the $SW^1/_4SW^1/_4NW^1/_4$ of sec. 27, T. 16 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches
Thickness of mollic epipedon—20 to 30 inches

Particle-size control section:
Clay content—24 to 35 percent
Rock fragment content—50 to 85 percent

A horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt horizon:
Chroma—2 to 4
Texture—very gravelly clay loam, extremely gravelly clay loam, or very gravelly loam
Gravel content—45 to 70 percent
Cobble content—0 to 15 percent
Reaction—moderately acid or slightly acid

Schnipper Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 2 to 12 percent
Elevation: 5,000 to 5,500 feet
Average annual precipitation: 10 to 14 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Fine-loamy, mixed, mesic Aridic Durixerolls

Typical Pedon

A—0 to 7 inches; brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine tubular pores; neutral; abrupt smooth boundary.
Bt—7 to 15 inches; brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; many very fine to medium roots; many very fine tubular pores; common distinct clay films on faces of peds and in pores; common very hard durinodes

1/4 to 1/2 inch in diameter; mildly alkaline; abrupt smooth boundary.
Bkq—15 to 30 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; massive; very hard, firm, sticky and plastic; common very fine to medium roots; common very fine tubular pores; many very hard durinodes 1/4 to 1/2 inch in diameter; violently effervescent (24 percent calcium carbonate equivalent); strongly alkaline; abrupt smooth boundary.
Bkqm—30 to 39 inches; very pale brown (10YR 7/3) gravelly silt loam, brown (10YR 4/3) moist; massive; extremely hard, firm; 30 percent gravel; thin laminar cap on top; weakly cemented matrix; strongly effervescent (12 percent calcium carbonate equivalent); strongly alkaline; abrupt smooth boundary.
2Bk—39 to 66 inches; light yellowish brown (10YR 6/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm, sticky and plastic; common very fine irregular pores; 15 percent gravel; common fine to medium light gray (10YR 7/2) segregated lime filaments, very pale brown (10YR 7/4) moist; violently effervescent (25 percent calcium carbonate equivalent); strongly alkaline.

Typical Pedon Location

Map unit in which located: Schnipper-Rogerson complex, 2 to 12 percent slopes
Location in survey area: About 8 miles east of Hollister, Idaho; in the NW1/4NW1/4SW1/4 of sec. 25, T. 12 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—9 to 24 inches
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—7 to 15 inches

Particle-size control section:
Clay content—26 to 35 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt horizon:
Chroma—2 or 3
Texture—silty clay loam, clay loam, or loam

Bkq horizon:
Calcium carbonate equivalent—10 to 25 percent

Bkqm horizon:
Thickness of silica laminations—1/8 to 1/2 inch
Thickness of duripan—3 to 12 inches

Scoon Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—old alluvium and eolian material; source—mixed
Slope range: 0 to 4 percent
Elevation: 3,350 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy, mixed, mesic, shallow Xerollic Durorthids

Typical Pedon

A—0 to 4 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, friable; common very fine to medium roots; common fine tubular pores; mildly alkaline; gradual wavy boundary.
Bk—4 to 13 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, friable; common very fine, fine, and medium roots; common fine tubular pores; strongly effervescent (23 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
2Bkqm—13 to 43 inches; continuous silica- and calcium-cemented indurated duripan; silica-cemented layers 3 to 4 inches thick; thin layers of calcium-cemented sandy loam or loam between plates; continuous silica cementation at a depth of 33 inches.

Typical Pedon Location

Map unit in which located: Scoon fine sandy loam, 1 to 4 percent slopes
Location in survey area: About 20 miles northwest of Buhl, Idaho; in the NE1/4NW1/4SE1/4 of sec. 33, T. 6 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—8 to 20 inches

Particle-size control section:
Gravel content—0 to 15 percent
Clay content—12 to 18 percent

A horizon:
Chroma—2 or 3

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3
Texture—loam or fine sandy loam

2Bkqm horizon:
Thickness of duripan—48 inches or more

Shabliss Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 4,400 to 4,900 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 110 to 120 days

Taxonomic class: Loamy, mixed, mesic, shallow Haploxerollic Durorthids

Typical Pedon

A—0 to 5 inches; brown (10YR 5/3) silt loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bw—5 to 10 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; neutral; clear smooth boundary.
Bkq—10 to 17 inches; very pale brown (10YR 7/4) silt loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; hard, friable; many very fine, fine, and medium roots; common very fine and fine tubular pores; 30 percent durinodes; strongly effervescent (15 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.
Bkqm—17 to 18 inches; cemented duripan with continuous silica- and calcium-carbonate-cemented laminar cap $^{1}/_{16}$ inch thick over very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate fine platy structure; very hard, firm and brittle; root mat on surface of laminar cap; few very fine roots along fracture planes; strongly effervescent (15 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.
2Bkq—18 to 31 inches; very pale brown (10YR 7/3) silt loam, yellowish brown (10YR 5/4) moist; massive; hard, firm; few very fine and fine roots; few very fine and fine tubular pores; 30 percent durinodes; strongly effervescent (15 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.
2Bkqm—31 to 36 inches; strongly cemented duripan over very pale brown (10YR 7/3) silt loam, light yellowish brown (10YR 6/4) moist; massive; very hard, very firm and brittle; strongly effervescent (11 percent calcium carbonate equivalent); clear wavy boundary.
2Bk—36 to 49 inches; very pale brown (10YR 7/4) silt loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable; few very fine and fine tubular pores; strongly effervescent (11 percent calcium carbonate equivalent); moderately alkaline; clear wavy boundary.
3Bkq—49 to 68 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm; few very fine and fine tubular pores; slightly effervescent (3 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Shabliss silt loam, 1 to 4 percent slopes
Location in survey area: About 7 miles northwest of Hollister, Idaho; in the $SW^{1}/_{4}SW^{1}/_{4}NE^{1}/_{4}$ of sec. 4, T. 12 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches

Depth to secondary lime—10 to 15 inches
Depth to duripan—10 to 20 inches

Particle-size control section:
Clay content—8 to 14 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4

Bkq horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4
Durinode content—10 to 20 percent

Bkqm horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—2 or 3
Thickness of upper silica lamination—1/16 inch to 2 inches

Shano Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—loess; source—mixed
Slope range: 1 to 4 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Camborthids

Typical Pedon

A1—0 to 5 inches; brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, friable; many very fine and fine roots; many very fine and fine tubular pores; neutral; abrupt smooth boundary.
A2—5 to 10 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable; many very fine and fine roots; many fine tubular pores; neutral; clear smooth boundary.
Bw1—10 to 17 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable; common very fine and fine roots; common fine tubular pores; mildly alkaline; gradual wavy boundary.
Bw2—17 to 29 inches; light yellowish brown (10YR 6/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable; few very fine roots; many very fine tubular pores; mildly alkaline; abrupt smooth boundary.
Bk—29 to 66 inches; pale brown (10YR 6/3) silt loam, yellowish brown (10YR 5/4) moist; massive; hard, friable; few very fine roots; many vesicular pores; strongly effervescent (12 percent calcium carbonate equivalent); mildly alkaline.

Typical Pedon Location

Map unit in which located: Shano silt loam, 1 to 4 percent slopes
Location in survey area: About 2 miles north of Jerome, Idaho; in the SE1/4SE1/4SW1/4 of sec. 1, T. 8 S., R. 16 E.

Range in Characteristics

Profile:
Depth to secondary lime—16 to 40 inches

A1 horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4
Clay content—5 to 10 percent

Bk horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—3 or 4
Texture—silt loam or very fine sandy loam

Sidlake Series

Depth class: Moderately deep to basalt
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—eolian material and alluvium; source—mixed
Slope range: 1 to 15 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 11 inches
Average annual air temperature: 47 to 49 degrees F

Frost-free period: 130 to 140 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A1—0 to 4 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; moderate medium platy structure; loose; many very fine and fine roots; many fine irregular pores; neutral; abrupt smooth boundary.

A2—4 to 12 inches; yellowish brown (10YR 5/4) loamy fine sand, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; hard, friable; many very fine and fine roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular pores; few faint clay films on faces of peds and in pores; 5 percent gravel; neutral; gradual wavy boundary.

Bt2—20 to 32 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 10 percent gravel; mildly alkaline; abrupt smooth boundary.

R—32 inches; fractured basalt; lime coatings on surface and in fractures.

Typical Pedon Location

Map unit in which located: Harsan-Sidlake-Quincy complex, 1 to 8 percent slopes

Location in survey area: About 7 miles northwest of Jerome, Idaho; in the NE$^{1}/_{4}$NE$^{1}/_{4}$SW$^{1}/_{4}$ of sec. 20, T. 7 S., R. 16 E.

Range in Characteristics

Profile:
Depth to bedrock—20 to 40 inches

Particle-size control section:
Clay content—20 to 30 percent

A1 horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4
Gravel content—0 to 10 percent

Bt horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4
Texture—sandy clay loam, loam, or clay loam
Gravel content—0 to 10 percent

Sluka Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 1 to 50 percent
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-silty, mixed, mesic Xerollic Durorthids

Typical Pedon

A—0 to 4 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; slightly effervescent (5 percent calcium carbonate equivalent); mildly alkaline; gradual wavy boundary.

Bkq1—4 to 11 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable; many very fine, fine, and medium roots; many very fine and fine tubular pores; 20 percent durinodes; strongly effervescent (10 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.

Bkq2—11 to 21 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; very hard, very firm; common very fine, fine, and medium roots; common very fine tubular pores; 40 percent durinodes; strongly effervescent (16 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bkqm—21 to 37 inches; cemented duripan that has a continuous $^{1}/_{16}$-inch-thick silica- and calcium-carbonate-cemented laminar cap over pale brown (10YR 6/3) loam, brown

(10YR 5/3) moist; massive; very hard, very firm and brittle; root mat on surface of laminar cap; few very fine roots along fracture planes; strongly effervescent (13 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

2Bk—37 to 51 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable; strongly effervescent (13 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

2Bkqm—51 to 61 inches; indurated duripan that has a continuous silica- and calcium-carbonate-cemented laminar cap 1/4 inch thick and is underlain by pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; massive; very hard, very firm and brittle; strongly effervescent (11 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Sluka silt loam, 4 to 8 percent slopes

Location in survey area: About 16 miles northwest of Buhl, Idaho; in the SW1/4SW1/4SE1/4 of sec. 15, T. 8 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—0 to 12 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—12 to 18 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Gravel content—0 to 10 percent
Calcium carbonate equivalent—0 to 10 percent
Reaction—neutral or mildly alkaline

Bkq horizon:
Value—6 to 8 dry, 3 to 6 moist
Chroma—2 or 3
Texture—silt loam or very fine sandy loam
Calcium carbonate equivalent—10 to 20 percent
Durinode content—10 to 40 percent

Bkqm horizon:
Calcium carbonate equivalent—15 to 25 percent
Thickness of silica lamination—1/16 inch to 2 inches
Texture—loam, very fine sandy loam, or silt loam

Starbuck Series

Depth class: Shallow to basalt
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 4 percent
Elevation: 3,500 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Loamy, mixed, mesic Lithic Xerollic Camborthids

Typical Pedon

A—0 to 5 inches; yellowish brown (10YR 5/4) silt loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, friable; many very fine and fine roots; many very fine and fine vesicular pores; 5 percent gravel; neutral; clear smooth boundary.

Bw1—5 to 14 inches; yellowish brown (10YR 5/4) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable; many very fine and fine roots; many fine tubular pores; 5 percent gravel; neutral; gradual wavy boundary.

Bw2—14 to 18 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable; few very fine and fine roots; common very fine and fine tubular pores; 10 percent gravel; neutral; abrupt wavy boundary.

R—18 inches; fractured basalt; lime coating on surface and in fractures.

Typical Pedon Location

Map unit in which located: Barrymore-Starbuck complex, 1 to 4 percent slopes

Location in survey area: About 9 miles north of Jerome, Idaho; in the NW1/4SW1/4SW1/4 of sec. 7, T. 7 S., R.18 E.

Range in Characteristics

Profile:
Depth to bedrock—12 to 20 inches

Particle-size control section:
Clay content—5 to 15 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist

Chroma—3 or 4
Gravel content—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4
Gravel content—0 to 10 percent

Stricker Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Breaks
Parent material: Kind—colluvium; source—welded tuff
Slope range: 15 to 75 percent
Elevation: 4,300 to 6,000 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Loamy-skeletal, mixed, mesic Calcic Haploxerolls

Typical Pedon

A—0 to 3 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 15 percent gravel, 5 percent cobbles, and 20 percent stones; neutral; gradual wavy boundary.

Bw1—3 to 12 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; 25 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

Bw2—12 to 22 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine tubular pores; 35 percent gravel and 40 percent cobbles; neutral; abrupt smooth boundary.

Bk1—22 to 29 inches; very pale brown (10YR 7/3) extremely cobbly loam, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine irregular pores; 30 percent gravel and 35 percent cobbles; strongly effervescent (18 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.

Bk2—29 to 61 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, pale brown (10YR 6/3) moist; single grain; hard, firm; few fine and very fine roots; few very fine irregular pores; 30 percent gravel and 50 percent cobbles; strongly effervescent (30 percent calcium carbonate equivalent); strongly alkaline.

Typical Pedon Location

Map unit in which located: Stricker-Nawt-Rock outcrop association, 30 to 75 percent slopes
Location in survey area: About 10 miles east of Hollister, Idaho; in the NE$^1/_4$SE$^1/_4$NW$^1/_4$ of sec. 17, T. 12 S., R. 18 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—18 to 32 inches
Thickness of mollic epipedon—10 to 18 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3
Gravel content—10 to 20 percent
Cobble content—5 to 20 percent
Stone content—15 to 20 percent

Bw2 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—extremely cobbly loam, very cobbly clay loam, or very gravelly silt loam
Clay content—18 to 30 percent
Gravel content—30 to 40 percent
Cobble content—10 to 40 percent

Bk horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 or 4
Texture—very cobbly loam, extremely cobbly loam, or extremely cobbly sandy loam
Gravel content—20 to 40 percent
Cobble content—30 to 50 percent
Calcium carbonate equivalent—15 to 35 percent

Suepert Series

Depth class: Moderately deep to a duripan

Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 15 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 9 to 10 inches
Average annual air temperature: 50 to 52 degrees F
Frost-free period: 130 to 140 days

Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Durorthids

Typical Pedon

A—0 to 8 inches; yellowish brown (10YR 5/4) extremely stony silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; 5 percent gravel, 40 percent cobbles, and 15 percent stones; neutral; gradual wavy boundary.
Bw1—8 to 18 inches; yellowish brown (10YR 5/4) very cobbly silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine tubular pores; 10 percent gravel, 30 percent cobbles, and 10 percent stones; neutral; gradual wavy boundary.
Bw2—18 to 32 inches; yellowish brown (10YR 5/4) extremely cobbly silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine tubular pores; 10 percent gravel, 50 percent cobbles, and 10 percent stones; neutral; abrupt smooth boundary.
Bkqm—32 to 48 inches; white (10YR 8/2) very cobbly indurated duripan, very pale brown (10YR 7/3) moist; massive; extremely hard, extremely firm; continuous fractured laminar opal cap $^1/_{16}$ to $^1/_8$ inch thick; fractures $^1/_4$ inch wide and more than 10 inches apart; violently effervescent; gradual wavy boundary.
C—48 to 80 inches; lime-coated sand, gravel, cobbles, and stones.

Typical Pedon Location

Map unit in which located: Suepert-Taunton complex, 1 to 15 percent slopes
Location in survey area: About 9 miles west of Eden, Idaho; in the SW$^1/_4$NE$^1/_4$SW$^1/_4$ of sec. 26, T. 9 S., R. 18 E.

Range in Characteristics

Profile:
Depth to sand, gravel, cobbles, and stones—34 to 60 inches or more
Depth to bedrock—more than 60 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—15 to 25 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Gravel content—5 to 20 percent
Cobble content—40 to 45 percent
Stone content—15 to 20 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—very cobbly loam, very cobbly silt loam, or extremely cobbly silt loam
Gravel content—10 to 15 percent
Cobble content—30 to 50 percent
Stone content—10 to 15 percent

Bkqm horizon:
Thickness of duripan—14 to 28 inches

Tanner Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium and residuum; source—mixed and basalt
Slope range: 1 to 10 percent
Elevation: 5,200 to 5,900 feet
Average annual precipitation: 9 to 13 inches
Average annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 110 days

Taxonomic class: Fine, montmorillonitic, frigid Aridic Durixerolls

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; many very fine tubular pores; neutral; abrupt smooth boundary.
AB—3 to 7 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR

3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many roots; many very fine tubular pores; slightly acid; clear smooth boundary.

Bt1—7 to 16 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; strong fine angular blocky structure; hard, firm, sticky and plastic; common very fine, fine, and medium roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; neutral; gradual wavy boundary.

Bt2—16 to 22 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; strong medium angular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common distinct clay films on faces of peds and in pores; neutral; gradual wavy boundary.

Bk—22 to 35 inches; very pale brown (10YR 8/3) gravelly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; 15 percent gravel and duripan fragments; violently effervescent (30 percent calcium carbonate equivalent); mildly alkaline; abrupt smooth boundary.

Bkqm—35 to 51 inches; white (10YR 8/2) fractured duripan, very pale brown (10YR 7/3) moist; massive; indurated; extremely hard, extremely firm; many 1/8- to 1/2-inch-thick lime- and silica-cemented lenses mixed with basalt gravel and cobbles; fractures 1/4 inch wide and 12 inches apart; violently effervescent; moderately alkaline; abrupt smooth boundary.

2R—51 inches; dark gray (10YR 4/1) basalt, black (10YR 2/1) moist; lime coating; violently effervescent.

Typical Pedon Location

Map unit in which located: Budlewis-Tanner complex, 2 to 6 percent slopes

Location in survey area: About 20 miles west of Rogerson, Idaho; in the NW1/4NW1/4SW1/4 of sec. 19, T. 14 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—40 to 60 inches or more
Depth to duripan—20 to 40 inches
Thickness of mollic epipedon—8 to 18 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3

Bt1 horizon:
Chroma—2 or 3
Texture—silty clay loam or clay loam
Clay content—30 to 38 percent

Bt2 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3
Texture—silty clay, cobbly silty clay, or gravelly silty clay
Gravel content—0 to 10 percent
Cobble content—0 to 10 percent
Stone content—0 to 5 percent
Clay content—40 to 48 percent

Bk horizon:
Value—6 to 8 dry, 4 to 7 moist
Chroma—3 or 4
Texture—gravelly loam, loam, or silt loam
Gravel content—5 to 20 percent
Cobble content—0 to 5 percent
Clay content—16 to 26 percent
Reaction—mildly alkaline or moderately alkaline

Bkqm horizon:
Thickness of upper silica lamination—1/2 to 1 inch
Thickness of lower silica laminations—1 inch to 2 inches
Thickness of duripan—3 to 16 inches

Taunton Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 8 percent
Elevation: 3,000 to 4,100 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 52 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Coarse-loamy, mixed, mesic Xerollic Durorthids

Typical Pedon

Ap1—0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose; many very fine and fine roots; many very fine and fine tubular

pores; slightly effervescent; mildly alkaline; clear smooth boundary.
Ap2—3 to 12 inches; brown (10YR 5/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky; many very fine and fine roots; many very fine and fine tubular pores; slightly effervescent; mildly alkaline; clear smooth boundary.
Bw—12 to 18 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky; common very fine and fine roots; common very fine and fine tubular pores; slightly effervescent; mildly alkaline; clear smooth boundary.
Bk1—18 to 29 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky; few very fine and fine roots; common very fine and fine tubular pores; slightly effervescent; mildly alkaline; clear smooth boundary.
Bk2—29 to 38 inches; very pale brown (10YR 8/3) gravelly loam, very pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky; few very fine roots; few very fine and fine tubular pores; slightly effervescent; 15 percent gravel-sized duripan fragments; moderately alkaline; abrupt smooth boundary.
Bkqm—38 to 52 inches; white (10YR 8/2) fractured indurated duripan, light yellowish brown (10YR 6/4) moist; massive; extremely hard, extremely firm; many continuous silica-cemented laminations throughout duripan; violently effervescent.

Typical Pedon Location

Map unit in which located: Taunton sandy loam, 1 to 4 percent slopes
Location in survey area: About 4 miles southwest of Eden, Idaho; in the NW$^1/_4$NW$^1/_4$SW$^1/_4$ of sec. 31, T. 9 S., R. 19 E.

Range in Characteristics

Profile:
Depth to secondary lime—10 to 20 inches
Depth to duripan—20 to 40 inches

Ap1 horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Texture—sandy loam, fine sandy loam, silt loam, or loam

Bk horizon:
Value—6 to 8 dry, 4 to 6 moist
Chroma—2 or 3
Texture—sandy loam, fine sandy loam, silt loam, loam, or gravelly loam
Gravel content—0 to 20 percent

Tock Series

Depth class: Moderately deep to a duripan
Drainage class: Well drained
Permeability: Slow
Position on landscape: Terraces
Parent material: Kind—alluvium; source—welded tuff and volcanic ash
Slope range: 1 to 6 percent
Elevation: 5,200 to 5,600 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 100 days

Taxonomic class: Fine, montmorillonitic, frigid Xerollic Durargids

Typical Pedon

A—0 to 4 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate medium platy structure; soft, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bt1—4 to 13 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; common faint clay films on faces of peds and in pores; neutral; clear smooth boundary.
Bt2—13 to 30 inches; yellowish brown (10YR 5/4) silty clay, yellowish brown (10YR 5/4) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; 5 percent gravel; neutral; abrupt smooth boundary.

Bkqm—30 to 36 inches; light yellowish brown (10YR 6/4) indurated duripan, dark yellowish brown (10YR 4/4) moist; massive; many continuous silica laminations between cemented sand and gravel; abrupt smooth boundary.
2C—36 to 60 inches; multicolored loose sand and gravel.

Typical Pedon Location

Map unit in which located: Tock loam, 1 to 6 percent slopes
Location in survey area: About 12 miles southeast of Rogerson, Idaho; in the NW$^1/_4$SE$^1/_4$SW$^1/_4$ of sec. 7, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to duripan—20 to 40 inches

Particle-size control section:
Clay content—35 to 45 percent

A horizon:
Gravel content—0 to 15 percent

Bt horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4
Texture—silty clay loam or silty clay

Bkqm horizon:
Thickness of silica laminations—$^1/_4$ to 1 inch
Thickness of duripan—3 to 10 inches

Trevino Series

Depth class: Shallow to basalt
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—alluvium and loess; source—mixed
Slope range: 0 to 20 percent
Elevation: 3,000 to 4,500 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 49 to 51 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy, mixed, mesic Lithic Xerollic Camborthids

Typical Pedon

A—0 to 4 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; soft, friable; many very fine and fine roots; many very fine and fine vesicular pores; neutral; clear smooth boundary.
Bw—4 to 14 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable; common very fine and fine roots; common very fine and fine tubular pores; neutral; gradual wavy boundary.
Bkq—14 to 18 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable; few fine roots; common very fine tubular pores; moderately alkaline; abrupt smooth boundary.
R—18 inches; fractured basalt; lime coating on surface and in fractures.

Typical Pedon Location

Map unit in which located: Trevino-Rock outcrop complex, 2 to 20 percent slopes
Location in survey area: About 8 miles east of Murtaugh, Idaho; in the NE$^1/_4$SE$^1/_4$SW$^1/_4$ of sec. 28, T. 10 S., R. 21 E.

Range in Characteristics

Profile:
Depth to bedrock—10 to 20 inches
Depth to secondary lime—8 to 18 inches

Particle-size control section:
Clay content—12 to 18 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Texture—silt loam or loam
Reaction—neutral or mildly alkaline

Bkq horizon:
Value—6 to 8 dry, 4 or 5 moist
Chroma—2 to 4
Texture—silt loam or loam

Tucker Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Slow

Position on landscape: Flood plains and terraces
Parent material: Kind—recent alluvium; source—welded tuff
Slope range: 0 to 2 percent
Elevation: 5,200 to 6,500 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days

Taxonomic class: Fine, montmorillonitic, frigid Cumulic Haploxerolls

Typical Pedon

A—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate fine platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; moderately alkaline; abrupt smooth boundary.
AB—6 to 11 inches; dark grayish brown (10YR 4/2) silty clay loam, black (10YR 2/1) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; mildly alkaline; clear smooth boundary.
Bw—11 to 32 inches; dark grayish brown (10YR 4/2) silty clay, black (10YR 2/1) moist; common faint distinct mottles, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Cg—32 to 70 inches; gray (10YR 5/1) silty clay, black (10YR 2/1) moist; common medium faint mottles, very dark grayish brown (10YR 3/2) moist; massive; hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral.

Typical Pedon Location

Map unit in which located: Tucker silt loam, 0 to 2 percent slopes
Location in survey area: About 14 miles southeast of Rogerson, Idaho; in the SW¼NW¼NW¼ of sec. 11, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to mottles—10 to 20 inches
Depth to water table—18 to 36 inches
Thickness of mollic epipedon—25 to 35 inches

Particle-size control section:
Clay content—35 to 50 percent

A horizon:
Value—3 to 5 dry
Chroma—1 or 2

Bw horizon:
Hue—2.5YR or 10YR
Value—3 to 5 dry, 2 to 4 moist
Chroma—1 or 2
Texture—silty clay loam or silty clay

Cg horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 2 to 4 moist
Chroma—1 to 3

Tulch Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Stream terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 0 to 2 percent
Elevation: 3,000 to 4,000 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Fine-silty, mixed, mesic Xerollic Camborthids

Typical Pedon

A—0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium platy structure; soft, very friable; common very fine and fine roots; many fine and very fine tubular pores; neutral; clear smooth boundary.
BA—3 to 9 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; mildly alkaline; gradual wavy boundary.

Bw1—9 to 16 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine tubular pores; mildly alkaline; clear wavy boundary.
Bw2—16 to 34 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and plastic; common very fine and fine roots; common fine tubular pores; 10 percent durinodes; mildly alkaline; gradual wavy boundary.
Bw3—34 to 38 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few fine tubular pores; slightly effervescent (5 percent calcium carbonate equivalent); moderately alkaline; gradual wavy boundary.
Bk—38 to 70 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few fine tubular pores; lime in filaments; strongly effervescent (12 percent calcium carbonate equivalent); moderately alkaline.

Typical Pedon Location

Map unit in which located: Tulch silt loam, 0 to 2 percent slopes
Location in survey area: About 15 miles southeast of Buhl, Idaho; in the NE$^{1}/_{4}$SW$^{1}/_{4}$SE$^{1}/_{4}$ of sec. 14, T. 8 S., R. 12 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to secondary lime—26 to 40 inches or more

Particle-size control section:
Clay content—18 to 30 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bw horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3
Texture—silt loam or silty clay loam

Bk horizon:
Value—6 or 7 dry, 4 or 5 moist
Texture—very fine sandy loam, silt loam, or silty clay loam
Clay content—16 to 30 percent
Durinode content—5 to 20 percent

Udaho Series

Depth class: Moderately deep to volcanic ash
Drainage class: Well drained
Permeability: Moderately rapid
Position on landscape: Hillsides and breaks
Parent material: Kind—colluvium and residuum; source—welded tuff and volcanic ash
Slope range: 10 to 65 percent
Elevation: 5,000 to 6,000 feet
Average annual precipitation: 10 to 13 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Loamy-skeletal, mixed, mesic Xerollic Calciorthids

Typical Pedon

A—0 to 7 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; weak fine granular structure; slightly hard, firm; many very fine, fine, and medium roots and common coarse roots; many very fine and fine tubular pores; 35 percent gravel; slightly effervescent; mildly alkaline; gradual wavy boundary.
Bk1—7 to 14 inches; very pale brown (10YR 7/3) very gravelly loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, firm; many roots; 50 percent gravel, mostly duripan fragments; strongly effervescent (16 percent calcium carbonate equivalent); moderately alkaline; clear wavy boundary.
Bk2—14 to 31 inches; very pale brown (10YR 7/3) very gravelly loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, firm; few coarse roots; 45 percent gravel-sized duripan and tuff fragments; strongly effervescent (19 percent calcium carbonate equivalent); moderately alkaline; clear wavy boundary.
Cr—31 to 60 inches; very pale brown (10YR 8/3) partially consolidated volcanic ash, pale yellow (2.5Y 7/4) moist; massive; extremely hard, extremely firm; few coarse roots; slightly effervescent.

Typical Pedon Location

Map unit in which located: Udaho very gravelly loam, 30 to 65 percent slopes
Location in survey area: About 15 miles south of Rogerson, Idaho; in the SE¼NE¼NE¼ of sec. 32, T. 16 S., R. 16 E.

Range in Characteristics

Profile:
Depth to secondary lime—6 to 15 inches
Depth to volcanic ash (paralithic contact)—20 to 40 inches

Particle-size control section:
Clay content—10 to 20 percent

A horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 or 3
Gravel content—35 to 45 percent
Reaction—mildly alkaline or moderately alkaline

Bk horizon:
Value—5 to 8 dry, 3 to 6 moist
Chroma—2 to 4
Texture—very gravelly loam or very gravelly sandy loam
Gravel content—35 to 50 percent
Cobble content—0 to 10 percent
Calcium carbonate equivalent—15 to 30 percent
Reaction—moderately alkaline or strongly alkaline

Cr horizon:
Hue—2.5Y to 10YR
Value—7 or 8 dry, 5 to 7 moist
Chroma—1 to 4
Effervescence—slight to strong

Wagonjacket Series

Depth class: Very deep
Drainage class: Somewhat poorly drained
Permeability: Moderate
Position on landscape: Flood plains
Parent material: Kind—recent alluvium; source—volcanic ash and welded tuff
Slope range: 0 to 1 percent
Elevation: 5,600 to 5,800 feet
Average annual precipitation: 14 to 16 inches
Average annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 105 days
Taxonomic class: Coarse-silty, mixed, frigid Cumulic Haploxerolls

Typical Pedon

A1—0 to 3 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; strong medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; neutral; clear smooth boundary.
A2—3 to 11 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; strong moderate granular structure; hard, friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; neutral; gradual wavy boundary.
BA—11 to 26 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; neutral; gradual wavy boundary.
Bg1—26 to 37 inches; light brownish gray (10YR 6/2) silt loam, dark gray (10YR 4/1) moist; few fine distinct mottles, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; neutral; clear smooth boundary.
Bg2—37 to 46 inches; light brownish gray (10YR 6/2) silt loam, dark gray (10YR 4/1) moist; common medium distinct mottles, yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; neutral; abrupt smooth boundary.
2Bg3—46 to 61 inches; light gray (10YR 7/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; many coarse distinct mottles, yellowish brown (10YR 4/6) moist; massive; slightly hard, friable; few very fine roots; common very fine and fine tubular pores; 25 percent gravel; neutral; abrupt smooth boundary.
3C—61 to 70 inches; multicolored layers of sand and gravel; single grain; loose; many coarse

distinct mottles, yellow (10YR 7/8) moist; neutral.

Typical Pedon Location

Map unit in which located: Wagonjacket silt loam, 0 to 1 percent slopes
Location in survey area: About 10 miles southeast of Rogerson, Idaho; in the SW¼NE¼NE¼ of sec. 23, T. 15 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to mottles—14 to 26 inches
Depth to water table—18 to 30 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 or 2

Bg horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—1 or 2

Weash Series

Depth class: Shallow to weakly consolidated ash
Drainage class: Well drained
Permeability: Moderately slow
Position on landscape: Terraces
Parent material: Kind—residuum and eolian material; source—weakly consolidated ash
Slope range: 2 to 12 percent
Elevation: 5,400 to 5,700 feet
Average annual precipitation: 10 to 12 inches
Average annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 110 days

Taxonomic class: Ashy, mesic, shallow Vitrixerandic Camborthids

Typical Pedon

A—0 to 2 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) moist; strong coarse platy structure; slightly hard, friable; many very fine, fine, and medium roots and common coarse roots; many very fine and fine vesicular pores; 20 percent gravel; neutral; abrupt smooth boundary.
Bw1—2 to 8 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many very fine, fine, and medium roots and common coarse roots; many very fine and fine tubular pores; neutral; clear smooth boundary.
Bw2—8 to 12 inches; brown (10YR 5/3) clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few roots; 80 percent weakly consolidated ash fragments that are ¼ inch to 4 inches in diameter and are oriented in same direction as parent material; neutral; clear wavy boundary.
Cr—12 to 60 inches; white (10YR 8/2) weakly consolidated ash, light gray (10YR 7/2) moist; strong very coarse platy structure; plates dip down at a 5 percent slope; root mat between plates; top of plates strongly effervescent; matrix of plates noncalcareous.

Typical Pedon Location

Map unit in which located: Weash gravelly sandy loam, 2 to 12 percent slopes
Location in survey area: About 13 miles south of Rogerson, Idaho; in the SW¼SE¼NW¼ of sec. 13, T. 16 S., R. 15 E.

Range in Characteristics

Profile:
Depth to weakly consolidated ash—10 to 20 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4
Gravel content—15 to 30 percent
Reaction—neutral or mildly alkaline

Bw horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4
Texture—sandy clay loam, clay loam, or loam
Clay content—20 to 30 percent
Reaction—neutral to moderately alkaline

Windypoint Series

Depth class: Very deep
Drainage class: Well drained
Permeability: Moderately slow over very rapid
Position on landscape: Terraces
Parent material: Kind—alluvium; source—mixed
Slope range: 1 to 4 percent
Elevation: 4,400 to 4,700 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F

Frost-free period: 110 to 120 days

Taxonomic class: Fine-loamy, mixed, mesic Xerollic Haplargids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate fine platy structure; slightly hard, friable; many very fine roots; common very fine vesicular pores; 10 percent gravel; neutral; abrupt smooth boundary.

Bt1—3 to 9 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; common fine tubular pores; few faint clay films on faces of peds and in pores; 15 percent gravel; mildly alkaline; clear smooth boundary.

Bt2—9 to 15 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; common fine tubular pores; few faint clay films on faces of peds and in pores; 15 percent gravel; mildly alkaline; clear smooth boundary.

Bt3—15 to 28 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; common fine tubular pores; few faint clay films on faces of peds and in pores; 25 percent gravel; slightly effervescent; mildly alkaline; clear smooth boundary.

2Bk—28 to 34 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable; few fine roots; few fine tubular pores; 75 percent gravel; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C—34 to 65 inches; multicolored sand and gravel; single grain; loose.

Typical Pedon Location

Map unit in which located: Windypoint-Arbidge complex, 1 to 4 percent slopes

Location in survey area: About 4 miles northwest of Hollister, Idaho; in the $SE^1/_4SW^1/_4SW^1/_4$ of sec. 13, T. 12 S., R. 15 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to sand and gravel—20 to 40 inches
Depth to carbonates—12 to 18 inches

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3

Bt horizon:
Value—5 or 6 dry
Clay content—25 to 30 percent

Xerorthents

Depth class: Shallow to very deep to bedrock
Drainage class: Well drained or somewhat excessively drained
Permeability: Moderately slow to moderately rapid
Position on landscape: Breaks
Parent material: Kind—colluvium; source—mixed
Slope range: 40 to 75 percent
Elevation: 2,800 to 6,000 feet
Average annual precipitation: 8 to 15 inches
Average annual air temperature: 44 to 52 degrees F
Frost-free period: 90 to 140 days

Taxonomic class: Xerorthents

Example Pedon

A—0 to 6 inches; pale brown (10YR 6/3) stony loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 5 percent gravel, 5 percent cobbles, and 10 percent stones; neutral; clear wavy boundary.

C—6 to 60 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; 5 percent gravel and 5 percent cobbles; mildly alkaline.

Example Pedon Location

Map unit in which located: Rock outcrop-Xerorthents complex, very steep

Location in survey area: About 4 miles northwest of Castleford, Idaho; in the $NE^1/_4NE^1/_4NE^1/_4$ of sec. 29, T. 10 S., R. 13 E.

Range in Characteristics

Profile:
Depth to bedrock—10 to 60 inches or more

Particle-size control section:
Clay content—10 to 32 percent

A horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 to 3
Texture—loamy sand to silt loam

C horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 or 3
Texture—sandy loam to clay loam
Gravel content—5 to 30 percent
Cobble content—5 to 15 percent
Stone content—0 to 5 percent

Yahoo Series

Depth class: Shallow to a duripan
Drainage class: Well drained
Permeability: Moderate
Position on landscape: Terraces
Parent material: Kind—old alluvium; source—mixed
Slope range: 0 to 4 percent
Elevation: 3,400 to 4,300 feet
Average annual precipitation: 8 to 10 inches
Average annual air temperature: 47 to 49 degrees F
Frost-free period: 120 to 140 days

Taxonomic class: Loamy, mixed, mesic shallow Xerollic Durorthids

Typical Pedon

A—0 to 3 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium platy structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine tubular pores; strongly effervescent (12 percent calcium carbonate equivalent); mildly alkaline; clear smooth boundary.

Bk—3 to 9 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; few very fine and fine tubular pores; slightly effervescent (15 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bkq—9 to 14 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; weak medium subangular block structure; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; 15 percent durinodes; violently effervescent (30 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

2Bkqm—14 to 34 inches; indurated duripan with continuous silica- and calcium-cemented laminar cap 1/8 inch thick over imbedded lamellae of silica pan and very pale brown (10YR 7/3) very fine sandy loam, brown (10YR 5/3) moist; very hard, very firm and brittle (pans about 5 percent of mass); root mat on surface of laminar; few very fine roots along fracture planes; violently effervescent (14 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

3Bkqm—34 to 60 inches; fractured duripan; 1/4- to 2-inch-thick silica lenses throughout extremely hard, platy, rocklike material.

Typical Pedon Location

Map unit in which located: Yahoo silt loam, 1 to 4 percent slopes
Location in survey area: About 9 miles west of Buhl, Idaho; in the NE1/4NE1/4NW1/4 of sec. 28, T. 9 S., R. 13E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to carbonates—0 to 4 inches
Depth to duripan—12 to 20 inches

Particle-size control section:
Clay content—20 to 30 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Calcium carbonate equivalent—0 to 15 percent
Reaction—neutral or mildly alkaline

Bkq horizon:
Value—5 to 7 dry, 3 to 5 moist
Clay content—18 to 32 percent
Calcium carbonate equivalent—15 to 30 percent
Durinode content—5 to 20 percent

2Bkqm horizon:
Texture—very fine sandy loam, loam, or silt loam
Calcium carbonate equivalent—10 to 30 percent
Thickness of upper silica lamination—1/16 to 1/4 inch

Zola Series

Depth class: Very deep
Drainage class: Moderately well drained
Permeability: Slow
Position on landscape: Flood plains and terraces
Parent material: Kind—recent alluvium; source—welded tuff and volcanic ash
Slope range: 0 to 2 percent
Elevation: 5,200 to 5,800 feet
Average annual precipitation: 12 to 16 inches
Average annual air temperature: 41 to 45 degrees F
Frost-free period: 80 to 100 days

Taxonomic class: Fine-loamy, mixed, frigid Cumulic Haploxerolls

Typical Pedon

A—0 to 5 inches; grayish brown (10YR 5/2) loam, black (10YR 2/1) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw1—5 to 13 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw2—13 to 21 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; slightly effervescent (12 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Bk1—21 to 28 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; strongly effervescent (12 percent calcium carbonate equivalent); common medium irregular filaments or threads of lime; moderately alkaline; clear smooth boundary.

Bk2—28 to 39 inches; gray (10YR 5/1) clay loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores; slightly effervescent (9 percent calcium carbonate equivalent); few fine irregular soft masses of lime; moderately alkaline; abrupt smooth boundary.

2Bk3—39 to 54 inches; very dark grayish brown (10YR 3/2) clay, very dark gray (10YR 3/1) moist; massive; very hard, very firm, very sticky and very plastic; few very fine roots; few fine tubular pores; slightly effervescent (7 percent calcium carbonate equivalent); few fine irregular soft masses of lime; moderately alkaline; abrupt smooth boundary.

2Bk4—54 to 70 inches; light yellowish brown (2.5Y 6/4) gravelly sandy clay, grayish brown (2.5Y 5/2) moist; common fine faint mottles (7.5YR 4/6) moist; massive; very hard, very firm, very sticky and very plastic; few fine pores; slightly effervescent (6 percent calcium carbonate equivalent); few fine irregular soft masses of lime; 30 percent gravel; neutral.

Typical Pedon Location

Map unit in which located: Zola loam, 0 to 2 percent slopes
Location in survey area: About 18 miles southeast of Rogerson, Idaho; in the $SE^1/_4NW^1/_4NE^1/_4$ of sec. 36, T. 16 S., R. 17 E.

Range in Characteristics

Profile:
Depth to bedrock—more than 60 inches
Depth to mottles—36 to 54 inches
Depth to water table—48 to 72 inches
Thickness of mollic epipedon—24 to 54 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3

Bw horizon:
Value—4 or 5 dry
Chroma—1 to 3
Texture—loam, silty clay loam, or clay loam
Clay content—16 to 30 percent

Bk horizon:
Value—3 to 6 dry
Chroma—1 to 4
Gravel content—0 to 5 percent
Effervescence—slight to strong

Formation of the Soils

Prepared by Dal Ames, soil scientist, Natural Resources Conservation Service.

This section describes the major processes of soil formation affecting the soils in the survey area. Soil is a natural, three-dimensional body covering the land surface that supports or is capable of supporting plants *(4)*. It is a fundamental part of the ecosystem and exists in balance with the other components of the environment. Soil is a mixture of minerals, organic matter, water, and air, all of which occur in varying proportions. Soils differ in their appearance, productivity, and management requirements in different areas and even within short distances.

Soils are characterized by the vertical sequence of layers, or horizons, that vary in color, texture, chemistry, and structure. Horizons are continually forming and evolving, usually over long periods of time, in response to environmental forces.

The characteristics and properties of soils are determined by physical and chemical processes that result from the interaction of five factors-climate, living organisms, topography, time, and parent material *(4)*. The influence of any one of these factors varies from place to place, but the interaction of all the factors determines the kind of soil that forms.

This section provides information on the influence of each soil-forming factor on the soils in this survey area.

Climate

Climate has had a strong influence on soil formation in the survey area. Temperature and precipitation affect the weathering of rock; the decomposition of minerals; the activity of micro-organisms; the process of leaching, illuviation, and eluviation; the kind and amount of vegetation; and the accumulation and decomposition of organic matter.

The present climate in the survey area is warm and dry in summer and generally cool and moist in winter. About 80 percent of the average annual precipitation falls during October through May. Much of the precipitation falls as snow at the higher elevations.

Temperature and precipitation are strongly influenced by the topography of the area. Generally, average annual precipitation increases and average annual temperature decreases as elevation increases. The warmest and driest part of the survey area is at the lowest elevations along the Snake River. These areas receive about 10 inches of precipitation annually and have an average annual temperature of about 48 degrees F. The greatest amount of precipitation and the coldest temperatures occur in the mountains in the southwestern part of the survey area. These areas receive about 20 to 25 inches of precipitation annually and have an average annual temperature of 40 to 44 degrees F.

Some of the older soils in the survey area developed under different climatic conditions. These soils have an argillic horizon and a high accumulation of illuvial clay. They probably developed dominantly during the Pleistocene (10,000 to 50,000 years ago) when the average annual precipitation was much greater.

Soil temperatures in the survey area are widely varied because of the variations in elevation. Relief over the entire area is about 5,000 feet. Mesic soil temperature regimes are at elevations of less than 5,300 to 5,700 feet. Frigid soils generally are at elevations of more than 5,700 feet, but some soils on north and east aspects at an elevation of about 4,800 feet also are frigid. Cryic soils are at elevations of more than 6,500 feet.

Precipitation in the area also varies greatly, depending primarily on elevation. The average annual precipitation ranges from about 10 inches at Jerome to about 25 inches on the highest ridges in the southwestern part of the survey

area. Precipitation on the Snake River Plain ranges from less than 9 inches to about 12 inches annually, and most of the soils on the plain have an aridic soil moisture regime. Soils that are shallow and moderately deep to a duripan are common in areas of the Snake River Plain where the average precipitation is about 0.8 inch during July through September. The low precipitation allows the soil profile to dry out and the calcium carbonate and silica to precipitate.

The soil moisture regime is dominantly xeric at the higher elevations where the precipitation is more than about 13 inches annually. Somewhat poorly drained soils on stream bottoms are in the aquic moisture regime. Soils that have a duripan and are at elevations of more than 5,800 feet generally are cemented with silica and do not have calcium carbonates in the profile. Oshone and Forvic soils exhibit these characteristics.

Living Organisms

Living organisms, consisting of plant and animal life, play a significant part in soil formation. The kind and amount of vegetation have a strong influence on soil development. Animals, insects, bacteria, and other organisms also influence soil development by adding organic matter to the soil and by stirring and aerating it. The kind and amount of living organisms in an area are largely dependent on climatic factors.

At elevations below 5,000 feet, plant production is limited by the amount of effective moisture. Annual additions of organic matter are small. Relatively young soils, such as those of the Bahem, Portneuf, and Sluka series, have a light-colored surface layer. Older soils in these areas, such as those of the Chuska, Power, Purdam, and Roseworth series, have accumulated more organic matter and have a thin dark-colored surface layer.

Plant production, especially that of grasses, is much greater at the higher elevations. The abundance of fibrous roots adds mulch to the soils, and thick dark-colored surface horizons form. Micro-organisms and earthworms are very active in these areas. They have influenced the color, structure, and physical condition of soils such as those of the Doodlelink, Keman, Oshone, and Tanner series.

Topography

The survey area is characterized by terraces, dip slopes, hill slopes, breaks, ridges, and summits. These surfaces formed as a result of geologic action. Relief influences soil formation by its effect on erosion, effective precipitation, soil drainage, air drainage, and exposure to sun and wind *(4)*.

Soils on stable terraces generally exhibit the most development because of the reduced risk of erosion and runoff. On steep slopes, parent material is unstable and the risk of runoff and erosion is higher.

Aspect dictates the amount of sunlight and moisture a soil receives. Soils on north and east aspects of breaks, hill slopes, and dip slopes receive less sunlight than those on south and west aspects. As a result, the soil temperatures are lower and the snow stays on the ground longer, providing moisture longer into the growing season. The moisture is sufficient to produce a thick plant cover that controls erosion; consequently, the soils are deeper. Because the vegetation is abundant and the soil temperature inhibits the breakdown of organic matter, the soils in these areas have a thick dark-colored surface horizon. Dehana and Doodlelink soils are examples.

Soils on south and west aspects of breaks, hill slopes, and dip slopes typically are shallower and have a thin dark-colored surface layer. The direct sunlight in these areas heats and dries out the soils quickly during the growing season. This speeds the breakdown of organic matter and limits plant growth, which increases the risk of erosion. Examples are the Stricker and Udaho soils.

Soils on ridges and summits are subject to geologic erosion, and they receive less moisture because the snow is blown away by the wind. Generally, these soils dry out quickly because of the warm soil temperatures and the low amount of effective moisture. The soils generally are shallow or moderately deep, have a thin surface layer, and have a high content of rock fragments. Brose, Ragpie, and Rutherford soils exhibit these characteristics.

Soils in concave areas and on back slopes and foot slopes generally receive more moisture as a result of runoff and snow drifting from convex areas. Because these soils receive more

moisture, they produce more abundant vegetation, which reduces the risk of erosion. The very deep Congle soils are in concave areas and on foot slopes. These soils have a thick dark-colored surface layer.

Soils on alluvial terraces are nearly level and have a fluctuating water table. They are somewhat poorly drained or poorly drained. Hutton and Tucker soils are examples.

Time

The climatic factors and the variability of the parent material, relief, and vegetation in the survey area have produced a wide variety of soils; however, the different horizons present in the soils and the degree of development is directly related to time *(4)*. The relationship between age and soil development is explained further in the section "Parent Material."

Parent Material

Geologically, the survey area is part of the Snake River Plain. During the Mesozoic era, the area uplifted and low hills formed. Events of the Cenozoic era dictated the present geology. Faults and fissures released molten lava from low profile shield volcanoes. There are about 40 shield volcanoes and basalt vents in the survey area. The bedrock in the area consists of shallow basalt lava flows underlain by ryholite. These lava flows intermittently blocked watercourses and created pluvial lakes that filled with sediment. The basalt flows and volcanic material along with glacial debris and lacustrine deposits influenced the many soils that developed in the survey area *(1)*.

Recent and Pleistocene Deposits

The Bonneville Flood, which occurred less than 14,200 years ago, influenced soil development in the survey area *(1)*. The floodwater split into two channels near Milner, Idaho. Part of the overflow took a route along an upland channel, and the other part followed the existing Snake River channel.

Soils in the upland channel formed an argillic horizon. The shallow Banbury soils formed on upland terraces, and the very deep Paulville soil formed in the intervening troughs and lower lying terraces. In areas where the waterflow slowed down, elongated gravel bars were deposited. The skeletal Suepert soils formed in these deposits. They have a cambic horizon over a weakly developed duripan.

The Bonneville Flood scoured the canyon in the existing Snake River channel. Perpendicular cliffs are common in the narrow canyon. The flood channels joined in the area between the Blue Lakes and one mile below the Hansen Bridge. The waters formed several alcoves, widened the canyon, filled the Snake River Canyon, and swept up large chunks of basalt. These rounded boulders, known as Melon Gravel, were deposited as sandy gravel bars in many areas along the canyon *(8)*. Soils in the Fathom series formed in these deposits.

North of Buhl, Idaho, the basalt flows protecting the Snake River Canyon give way to lower Pleistocene deposits and middle Pleistocene lava-dammed Snake Plain lakebeds of silt, clay, and diatomite. These deposits make up various formations, including the Glens Ferry and Bruneau Formations.

The Glens Ferry Formation is exposed at the Hagerman Fossil Beds. It is about 2,000 feet thick and consists of intertonguing lake and stream deposits. Lacustrine material with thick ripple-marked sand and silt is widespread *(8)*. Soils of the Quincy series formed in this material.

The Bruneau Formation consists of lacustrine sediment and basalt flows associated with the damming and breaching of the Snake River. These extensive areas of silt, clay, and basalt flows eroded into badlands. Soils of the Kudlac series formed in this material.

The soils on narrow stream terraces and flood plains formed in recent alluvium (less than 10,000 years old) *(16)*. This alluvium was deposited during periods of stream aggradation. These soils developed a thick dark-colored surface layer that supports grass. Subsequent stream degradation has determined the present soil drainage. The moderately well drained Gosinta and Zola soils, the somewhat poorly drained Wagonjacket soils, and the poorly drained Hutton soils are examples. Soil texture ranges from silt loam to silty clay, depending on the source of the alluvium.

During the upper Pleistocene, watercourses were dammed by lava flows from basalt vents and shield volcanoes and alluvium accumulated in the uplands *(1)*. In the western part of Jerome

County, sandy alluvial material from ancient Lake McKinney accumulated. Soils that formed in these areas include the Kecko soils that have a cambic horizon, the Harsan and Hoosegow soils that have an argillic horizon, and the Taunton soils that have a nonconforming duripan. The Quincy soils formed in areas where sandy alluvium was reworked.

Lava flowed from shield volcanoes, such as Flat Top, Hansen, Hazelton, Hub, Skeleton, Sonnicksen, and Stricker Buttes, from the lower to upper Pleistocene. Using the carbon-14 method, the age of a paleosol under the Stricker Butte lava flow was estimated at 14,200+ 210 years B.P. Thus, the maximum age for the basalt, the lacustrine silt geomorphic surfaces, and the soils is less than 14,200 years. The truncated duripans are more than 14,200 years old, and the durinodes are less than 14,200 years old *(7)*.

The silty soils that formed in the pluvial lakes have an accumulation of calcium carbonate. Some of these soils, such as those of the Trevino series, are shallow to basalt, and some are underlain by a duripan, such as those of the Minidoka and Minveno series. A large area of silty soils formed in thick silt in the center of the valley away from the prevailing winds. These soils exhibit no particular pattern of particle size distribution *(7)*. Examples are the very deep Bahem, Portneuf, and Rad soils and the Sluka soils that have a duripan. All of these soils are on upland terraces.

Shield volcano lava flows from buttes such as Salmon Butte blocked stream channels. Gravel and gravelly alluvium were deposited in pluvial lakes that formed in areas east of Salmon Butte, in the Deep Creek area north and west of Hollister, in the Desert Creek area north and east of Hollister, and in the Rock Creek area. The Arbidge and Windypoint soils formed in the alluvial deposits underlain by gravel.

Upper and middle Pleistocene lava in the Snake River Plain underlies the upland terraces in the upper half of Jerome County *(11)*. These basalt flows are characterized by pressure ridges, which are low mounds of exposed rock that are about 100 feet across and rise a few feet above the surrounding landscape *(1)*. Soils on terraces in areas around these basalt outcroppings formed in a mixture of loess and alluvium. Those soils that formed in areas of middle Pleistocene lava flows exhibit greater soil development. The Hoosegow and Sidlake soils formed in fine-loamy material from which calcium carbonate was leached. The McCain and Power soils formed in fine-silty material. These soils have a layer of calcium carbonate accumulation and an argillic horizon. The Idow soils formed on broad terraces between pressure ridges. These soils have a duripan. The fine-textured Owinza soils formed in areas where clay and salts accumulated in depressions between terraces and pressure ridges. Soils that formed on the younger basalt flows, such as those of the Barrymore and Starbuck series, developed a cambic horizon.

Soils on upland terraces in the south-central part of Twin Falls County (about 4,000 to 5,600 feet in elevation) developed in a mixture of loess and alluvium *(16)*. Lower to middle Pleistocene basalt underlies these areas *(11)*. Most of the soils have a layer of calcium carbonate accumulation and are shallow to a well developed, thick duripan that may be a remnant of an eroded paleosol. The Chiara soils formed in mixed coarse-silty alluvium and loess; the Chuska, Colthorp, Elijah, Lankbush, and Roseworth soils formed in moderately fine textured alluvium; and the Ackett, Lud, and Pigtail soils formed in fine textured alluvium. All of these soils except the Chiara soils have an argillic horizon. In the Idavada area, the Pleistocene basalt was eroded and weakly consolidated ash deposits were exposed. Shallow, ashy soils, such as those of the Weash series, formed in these deposits. These soils have a cambic horizon.

Pliocene Deposits

Soils on upland terraces in the southern part of the survey area, near Signal and Cedar Buttes, west of Shoshone Creek on Browns Bench, and in Shoshone Basin, formed in fine textured Pliocene alluvium *(10)*. Most of these soils have a mollic epipedon; however, a rainshadow restricted the development of a mollic epipedon in the Elhina and Tock soils. Except for the loamy Arness soil, which formed in material derived from ignimbrite, and the fine-loamy Chayson soil, which formed in loess mixed with alluvium, soils that formed in the fine textured alluvium have an argillic horizon. Soils such as those of the Bancy, Budlewis, Forvic, and Oshone series formed in areas where salts and silica were leached and a duripan formed. The Aninto and Tanner soils formed in

alluvium derived from acidic rock that did not contain lime or in areas where rainfall was insufficient to leach the salts deep into the soil profile.

In the southern part of Twin Falls County, commonly known as the South Hills or Cassia Mountains, soils formed in material derived from Pliocene felsitic rock. These Idavada volcanics are composed of silica welded tuff, volcanic ash, and lava flows. This broad area slopes to the north and is sharply faulted and dissected. The rock was uplifted during the late Pliocene as the Snake River Plain subsided under the weight of the lava continuously flowing from the shield volcanoes *(1)*.

Soils on the breaks and hill slopes formed in welded tuff and volcanic ash *(16)*. Soils at the lower elevations, such as those of the Stricker series, formed in basic welded tuff and developed a calcic horizon. Soils at the higher elevations, such as those of the Nawt and Player series, formed in intermediate to acidic material. These soils developed ultic characteristics (low base saturation). Soils that formed in concave, sloping areas on north and east aspects, such as those of the Congle, Dehana, and Doodlelink series, developed ultic and pachic characteristics. Soils on hill slopes and breaks underlain by volcanic ash, such as those of the Eep series, are high in content of volcanic ash and have an argillic horizon and ultic characteristics. Soils on the highest hill slopes, such as those of the Kavon series, formed in acidic glacial till and colluvium.

On ridges at elevations of less than about 6,600 feet, shallow to very deep soils formed in intermediate to acidic welded tuff. Examples are the Amboat, Brose, and Ragpie soils. These soils have an argillic horizon and ultic characteristics. The Keman and Rutherford soils formed in acidic material on higher summits and ridges.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good

conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil stucture, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. The total thickness of weathered soil material over bedrock. In this survey the classes of soil depth are as follows: Shallow—10 to 20 inches; moderately deep—20 to 40 inches; deep—40 to 60 inches; very deep—60 inches or more.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. On a desert surface, a layer of gravel or larger fragments that was emplaced by upward movement of the underlying sediments or that remains after finer particles have been removed by running water or the wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Duff. A generally firm organic layer on the surface

of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Durinode. Weakly cemented to indurated nodule.

Duripan. A subsurface horizon that is cemented with silica to the degree that fragments do not slake during prolonged soaking in water or hydrochloric acid.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and

other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Growing season. The interval between the last occurrence of 32 degrees F in spring and the first occurrence of 32 degrees in fall. The length of the growing season is expressed as:

Very long	more than 140 days
Long	100 to140 days
Short	70 to 100 days
Very short	less than 70 days

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application.

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand or loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Can be penetrated and broken by normal agricultural tillage equipment.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium. The degrees of salinity, expressed as millimhos per centimeter, are:

None	less than 2
Low	2 to 4
Moderate	4 to 8
High	8 to 16
Very high	more than 16

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this

survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 20 percent
Moderately steep	20 to 30 percent
Steep	30 to 60 percent
Very steep	60 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as

taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.